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ABSTRACT

This guide presents lesson plans, with handouts, biographical sketches, and teaching guides, which show ways of integrating African American role models into mathematics and science lessons in kindergarten through grade 6. The guide is divided into mathematics and science sections, which each are subdivided into groupings: kindergarten through grade 2, grades 3 and 4, and grades 5 and 6. Many of the lessons can be adjusted for other grade levels. Each lesson has the following nine components: (1) concept statement; (2) instructional objectives; (3) male and female African American role models; (4) affective factors; (5) materials; (6) vocabulary; (7) teaching procedures; (8) follow-up activities; and (9) resources. The lesson plans are designed to supplement teacher-designed and textbook lessons, encourage teachers to integrate black history in their classrooms, assist students in developing an appreciation for the cultural heritage of others, elevate black students' self-esteem by presenting positive role models, and address affective factors that contribute to the achievement of blacks and other minority students in mathematics and science. Affective factors include developing positive attitudes in the early and middle grades, developing the ability to persist in the face of barriers, addressing stereotyping in mathematics and the sciences, understanding the utility of achievement in mathematics and science for everyday life and future careers, and maximizing the teacher's role as a positive significant other for the student. Three appendixes provide a summary of factors influencing minority student participation in mathematics and science, bibliographies of African and African American contributions to mathematics and science, and resources for incorporating African American role models in mathematics and science. (JB)

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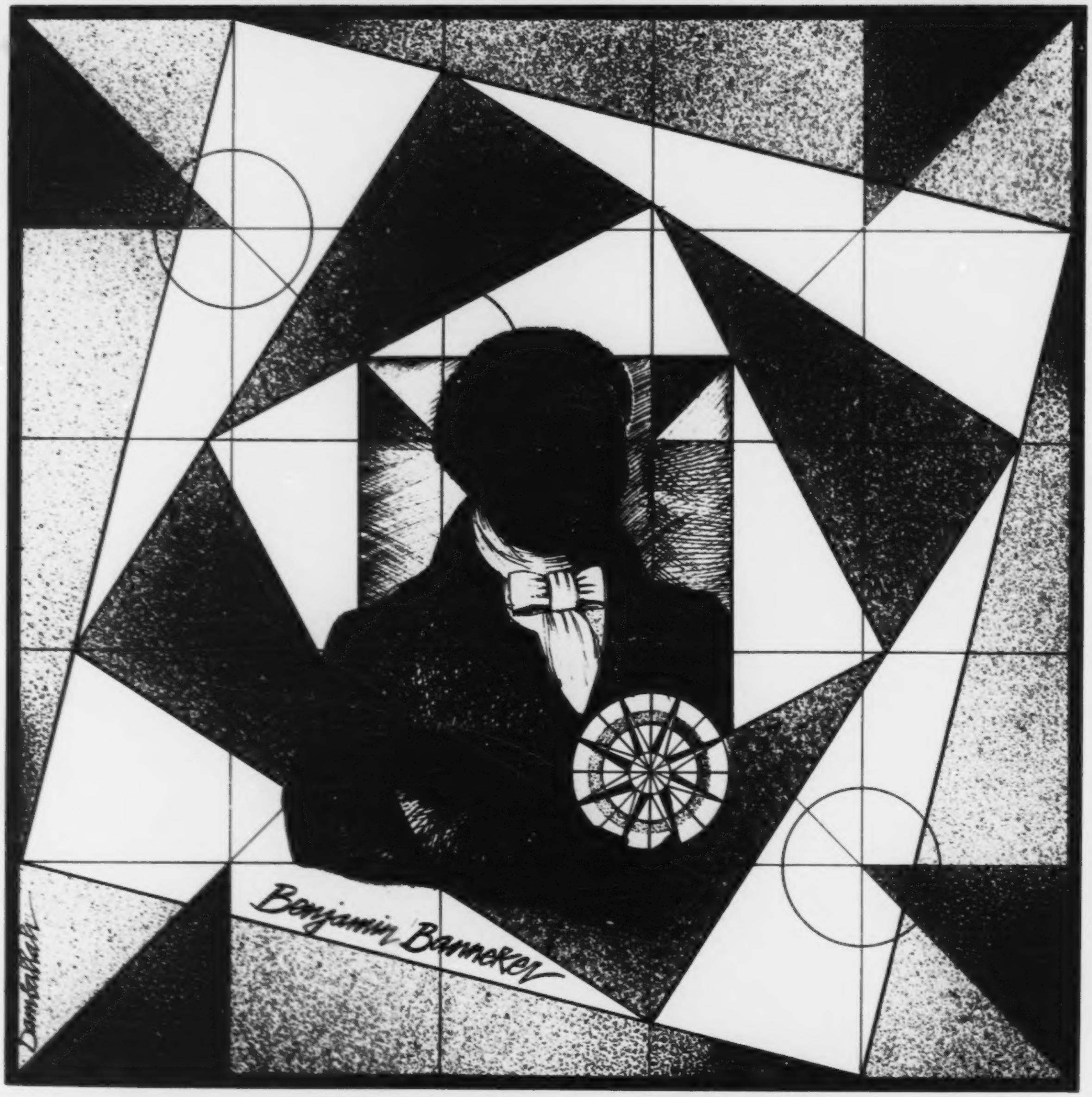
INTRODUCING
AFRICAN AMERICAN ROLE MODELS



INTO MATHEMATICS AND SCIENCE

LESSON PLANS: Grades K - 6

UD028888

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The Mid-Atlantic Equity Center

The Mid-Atlantic Equity Center (MAEC) is a desegregation assistance center funded by the U.S. Department of Education under Title IV of the Civil Rights Act of 1964. The Center provides technical assistance and training services to public schools and school districts in Delaware, Maryland, Pennsylvania, Virginia, West Virginia, and the District of Columbia. MAEC's mission is to assist educators in providing equitable instructional experiences to an increasingly diverse student population in three program areas: race, gender, and national origin. Services include long-term intervention as well as short-term training and support. The following are types of assistance available:

- system-wide assessment
- long-term planning and technical assistance
- data analysis and program evaluation
- administrative consultations
- training-of-trainers workshops
- staff development programs
- multicultural curriculum
- dissemination of information and publications

ACKNOWLEDGMENTS

It is with great pride that I present to you *Introducing African American Role Models into Mathematics and Science Lesson Plans: Grades K-6*. This project was nurtured in countless ways by the collaborative effort and the supportive spirit of the Mid-Atlantic Equity Center staff and its consultants. For the conceptualization and the writing of this publication, I would like to recognize the following authors:

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Sheryl J. Denbo, Ph.D.
Executive Director / Senior Editor

FOREWORD

Introducing African American Role Models into Mathematics and Science Lesson Plans: Grades K-6 has been designed to help counteract the effects of bias found in textbooks and instructional materials due to the omission, isolation, or stereotyping of Black men and women. We hope that these negative effects can be lessened by emphasizing African American contributions to the history of the United States. These lesson plans can also be used as a model to highlight the contributions of other underrepresented groups who have been excluded from the curriculum.

The goals of this publication include:

1. providing teachers with examples of how to incorporate African American role models into mathematics and science lessons;
2. encouraging teachers to integrate Black history in their lesson plans throughout the school year by infusing African American role models into all areas of curriculum;
3. assisting all students to develop an appreciation for the cultural heritage of others;
4. elevating Black students' self-esteem by presenting positive role models; and
5. encouraging students and teachers to be actively involved in creating better intergroup relations and understanding.

These lesson plans are to be used as a supplement to teacher-designed and textbook lessons. Teachers can redesign their lessons in every subject area to incorporate role models which introduce students to the contributions of various racial and ethnic groups.

INTRODUCTION

Students from groups that have traditionally been labeled minority rarely find people like themselves in their school books, classroom displays, or assignments. Unfortunately, those portrayed are frequently presented in stereotyped roles. Research indicates that curricular reinforcement of stereotyping encourages these underrepresented students to perceive themselves as less capable of academic success than other students. For majority students, societal stereotypes of minority group members are strengthened by the limited images presented in their instructional materials.

The annual recognition of Black History Month in February highlights the achievements of a few well-known African Americans. Yet often, a multicultural curriculum for all grade levels and subject areas is absent throughout the year. A wealth of information exists which remains untapped by the school curriculum. Significant contributions that have influenced the quality of human existence in America have been made by members of a wide variety of racial and ethnic groups. These contributions must not only be shared with students from those groups to foster the development of pride in their heritage, but also with majority group students to encourage their appreciation of the contributions and the cultural heritages of others in addition to their own.

Although textbooks have improved somewhat over the years, various racial and ethnic groups continue to be underrepresented, stereotyped, or even omitted. While teachers often make a conscious effort to ensure that classroom displays are multicultural, they may still find it difficult to infuse multicultural perspectives and role models into lessons and instructional materials.

Our textbooks contain almost no discussion of the African origin of mathematics and science. In fact, Africa is most often referred to as "primitive," "savage," or "underdeveloped." While there is still much debate, and much research that needs to be done detailing and documenting African contributions to mathematics and science, it is important to understand that mathematics and science have traditionally been taught in American schools from a solely Eurocentric perspective. This Eurocentric perspective tends to omit or distort the important contributions of other people.[1]

Research indicates that Black students start out with positive attitudes regarding mathematics and science. In fact, at age 13, African American students' attitudes regarding mathematics and science are more positive than their White counterparts. Unfortunately, the longer African American students stay in school, the more they lag behind in mathematics and science studies.[2]

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[1] For more information, see Appendix II: ***African and African American Contributions to Mathematics and African and African American Contributions to Science*** and Appendix III: ***Resources for Incorporating African American Role Models into Mathematics and Science.***

[2] *Digest of Education Statistics*, Washington, D.C.: U.S. Department of Education, 1990.

There is clear evidence that students of today will need mathematics and science for the occupations of tomorrow. It has been estimated that 60% of all jobs and 40% of all college majors will require significant mathematics skills.[3] To help address these issues, The Mid-Atlantic Equity Center (MAEC) has developed lesson plans in mathematics and science for elementary school students. Since Black students are the largest minority group in most of the school districts served by the Center, Black role models from a variety of occupations have been highlighted. Wherever possible, hands-on activities, as well as field trips, are also emphasized. Research indicates that all students respond positively to hands-on materials and real world applications.

While it is important to emphasize the contributions of diverse groups, a school or school district might want to begin making its curriculum more multicultural by initially emphasizing the contributions and cultural perspectives of the largest non-European group in their district, and then expanding to include other underrepresented groups. It has been estimated that in the year 2000, one in every three people will be non-White and presently in many school districts people of color are already the new majority. If we do not learn to tap the immense human resources in our traditionally underrepresented populations, our country will have difficulty surviving as a technological leader in the world market of the future. Highlighting the positive contributions and cultural perspectives of minority role models can help minority children envision themselves as future leaders. Integrating multicultural objectives into lesson plans is not a luxury, but a necessary part of the teaching/learning process.

Introducing African American Role Models into Mathematics and Science Lesson Plans: Grades K-6 was designed as an example of how to integrate role models, in this case, African American role models, into the areas of mathematics and science. Role models in diverse career fields for both male and female students are provided. The biographies included in these lesson plans will help all students better understand the culture and accomplishments of African Americans. At the same time, these lesson plans have been designed to address affective factors which contribute to the achievement of Blacks and other minority students in mathematics and science. The MAEC publication *Mathematics and Science: Critical Filters for the Future* (Beane, 1985) identifies those factors that research indicates are most significant in contributing to the underachievement of minority students in mathematics and science.[4] The affective factors addressed in these lesson plans include:

Attitudes:	Minority students have positive attitudes toward mathematics and science in the early and middle grades. How do we reinforce and keep these positive attitudes?
Persistence:	Those who are most successful in mathematics and science have developed the ability to persist. Having the ability to persist in the face of barriers is essentially related to a positive self-concept. How do we teach students to persist in the areas of mathematics and science?

---

[3] *Digest of Education Statistics*, Washington, D.C.: U.S. Department of Education, 1990.

[4] See Appendix 1 for a complete list of the cognitive and affective factors that both students and teachers bring into the classroom which contribute to minority student underachievement in mathematics and science, as well as effective instructional practices used to address those factors.

Stereotyping:	Many teachers, majority and minority, as well as many minority students, tend to stereotype mathematics and science as White male domains. How can we address this stereotyping?
Perceived Utility:	Minority students are less likely to understand how the study of mathematics and science is applicable to everyday life and valuable to their future schooling and jobs. How can we teach the usefulness of learning while teaching the content?
Influence of Significant Others	Teachers, counselors, parents, and peers have a role in shaping students' attitudes toward mathematics and science. How can we maximize the **teacher's role** as a positive significant other?

This publication is divided into two sections: Mathematics and Science. Each of these sections is subdivided into three grade level groupings: K-2, 3-4, and 5-6. In addition, many of the lessons can be adjusted for other grade levels. Each lesson includes nine components.

1. Concept Statement
2. Instructional Objectives
3. African American Role Models
4. Affective Factors
5. Materials
6. Vocabulary
7. Teaching Procedures
8. Follow-up Activities
9. Resources

The lesson plans have been designed to be used as a supplement to teacher-designed and textbook lessons. Before implementing them, we suggest the following: review each lesson, determine prerequisites, determine class level, and determine materials that the teachers and the students will need.

We welcome your comments on our publication and we encourage you to send the MAEC your favorite lesson plans. We are primarily interested in lesson plans that are activity or experientially based, utilize cooperative learning techniques, and integrate mathematics and science with each other and/or other disciplines. These lesson plans may be included in a second volume which would highlight the contributions of Hispanic Americans. Please organize your lesson plans, if possible, into the nine component format and send to:

The Mid-Atlantic Equity Center
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If your lesson plan is accepted for our second volume, we will fully acknowledge your contribution and send you complimentary copies of the publication. Your interest and support are appreciated.

Sheryl J. Denbo, Ph.D.
Executive Director / Senior Editor

"America has succeeded because, at every turn, it has been able to bring its most precious natural resources to bear on the tasks at hand: a diverse and talented people . . .

The one force that has sustained and empowered **all** *our people, has been the power of education. It has been our schools that have equipped individuals to take their places in the great work of transforming visions into realities . . . If, indeed, education is the way we deal with the future before it arrives, then we are truly casting our future aside if we do not bend every effort to open opportunities for minority children. The door to the future for every child is first and foremost the door to the schoolhouse."*

Education That Works: An Action Plan For
The Education Of Minorities
Quality Education for Minorities Project,
January 1990
Massachusetts Institute of Technology
Cambridge, Massachusetts

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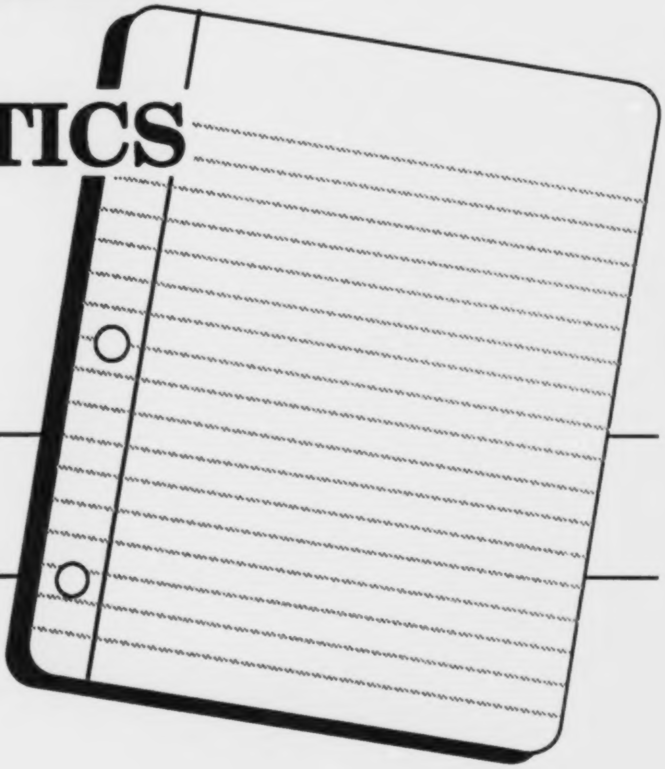

Grades K - 2

IDENTIFYING SETS

Subject:
MATHEMATICS

Grade Level:
K - 2

Concept Statement

A set is a well defined group of objects. The attributes (characteristics) of objects help define what objects belong within a set.

Instructional Objective

The student will:

- Identify sets of cars (family/passenger cars, race/sports cars, and utility/work cars).

African American Role Models

The student will:

- Identify Cheryl Glass as a Black woman who entered auto racing at age thirteen.
- Identify Willy T. Ribbs as the first Black race car driver to qualify for the Indianapolis 500.

Affective Factors

- *Persistence* - What seems difficult to achieve at first becomes easier through persistence.
- *Attitude* - Help maintain positive attitudes toward mathematics and science by demonstrating their application to those things students are already interested in.

Materials

Automobile and racing magazines
Glue
Models of all types of cars
Pictures of old and new model cars
Scissors

Vocabulary

Body type
Family/passenger car
Race/sports car
Utility/work car

Teaching Procedures

- Show pictures of different types of cars. Categorize them: family/passenger cars; race/sports cars; utility/work cars (trucks, vans, taxis). Look at body types, car lines, colors, etc. Note the different wheel sizes, interiors, exteriors, etc. Discuss the different speeds the various types of cars can attain.

  Family / Passenger Cars:
  roomy interior; high roof; rectangular prism shape; all colors

Race / Sports Cars:
sleek; built low to ground; big, sturdy wheels; bright colors

Utility / Work Cars:
sturdy exterior; big, durable wheels; built for heavy loads

List and discuss differences among various types of cars. Why are some built low to the ground?

Discuss how these different types of cars are used.

- Read to students the handout, ***Car Racing: Past to Present*** (page M-4). Write on the board the speed records of the past and those of today by listing them for each year. Discuss how cars can be made to go faster by changing designs and mechanisms. Ask students to draw what they think the cars of the future will look like.
- Read to the students the biographies, ***Cheryl Glass: Race Car Driver*** (page M-5) and ***Willy T. Ribbs: Race Car Driver*** (page M-7). Discuss their achievements and show their photographs. Ask students why they think Cheryl Glass and Willy T. Ribbs wanted to become race car drivers. Discuss how persistence made it possible for Glass and Ribbs to achieve their goals.
- Distribute the worksheet, ***Making Sets*** (pages M-9 through M-10). Students will be categorizing cars by purpose: (Family/passenger cars, race/sports cars, and utility/work cars).
- Discuss racing as a career, including what a person might need to achieve in order to become a race car driver. Factors to be included are: health, nutrition, clear vision, concentration, strength, quick reflexes, and persistence. Discuss required mathematical skills for determining speed and mileage.

Follow-up Activities

A good time for this lesson would be during the month of May when the Indianapolis 500 takes place. Some follow-up activities might be:

- Ask the students if they have ever seen a car race on television.
- Collect old automobile or racing magazines. Have the students cut out and categorize cars by attributes and purpose (i.e.: color, size, family/passenger car, etc).

Resources

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Green, Richard L. (Ed.) *Historic Black Firsts.* Chicago: Empak Publishing Company, 1990.

Ploski, Harry A. and James Williams (Eds.) *The Negro Almanac: A Reference Work on the African American.* (Fifth Edition) Detroit: Gale Research Inc., 1989.

"Racing Against the Odds." *Ebony.* (January 1980): 35:110.

"Racing to Success.". *Seventeen.* (July 1979): 36:126.

Handout:

Car Racing: Past to Present

Before cars were invented, people either walked or used animals such as horses to take them from one place to another. Cars were invented in the late 1800's. The first car race took place in France. It was called the "Race of the Horseless Carriages." In 1894, a Frenchman organized a race from Paris to Rouen, France, a distance of 79 miles. The trip took about seven hours, at an average of 12 miles per hour. Today, there are many car races throughout the world. One of the more famous races is called the **Indianapolis 500**. This race takes place in May of every year in Indianapolis, Indiana. Race car drivers from all over the world compete to see who can drive his/her car the fastest. In 1911, the winner won with a speed of 74 miles per hour (m.p.h.). In 1952, the winner won with a speed of 128 m.p.h. In 1989, the winner won with a speed of 167 m.p.h. In 1991, the winner won with a speed of 176 m.p.h.

Year	*Miles Per Hour Achieved*
1894	12 m.p.h.
1911	74 m.p.h.
1952	128 m.p.h.
1989	167 m.p.h.
1991	176 m.p.h.

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Biography:

Cheryl Glass:

Race Car Driver

(1961 -)

Cheryl Glass is a professional race car driver. When she was nine years old, she read a newspaper article about kids her age who were racing midget cars. Cheryl decided she wanted to race too, but she knew that it would cost a lot of money to buy the helmet and pads that every racer must wear. By age 13 she saved enough money to buy the equipment that she needed. She had made her own money by selling ceramic dolls that she had crafted.

Cheryl had seen ceramic dolls in the stores, and decided that she could make dolls too. So she did. When she showed her dolls to the people in the stores, they agreed to sell them. As people bought her dolls, she was able to save enough money to pay the $300.00 for her new racing equipment.

Cheryl was named Rookie of the Year her first year racing. She was the first female to ever receive this award. Her goal now is to become the first Black woman to race in the Indianapolis 500.

Her other interests include modeling and dancing. She has won several dance contests in her hometown, Seattle, Washington.

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Cheryl Glass

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Biography:

Willy T. Ribbs:

Race Car Driver

(1956-)

Willie T. Ribbs was the first Black man to race in the Indianapolis 500. As a young child, he wanted to drive fast cars, just like his father. When he was older, Willie began racing cars in the United States and in Europe. He won many awards and prizes for racing fast cars. In 1985, he tried out for the Indy 500, but his car wasn't fast enough and he did not get to compete. Bill Cosby heard about Willie and gave him enough money so that he could buy a faster car. By 1991, Willie had improved his car so much that it was fast enough to race in the Indy 500 and Willie was able to fulfill his childhood dream. Although he did not win the race, he learned a great deal from the experience and has promised to keep trying until he wins the Indy 500.

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Willy T. Ribbs (with Bill Cosby)

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Name ______________________________ Date ________________

Worksheet:

Making Sets

Cut out each car on the following page. Place the cars in rows to create three different sets.

FAMILY/PASSENGER CARS		

RACE/SPORTS CARS		

UTILITY/WORK CARS OR TRUCKS		

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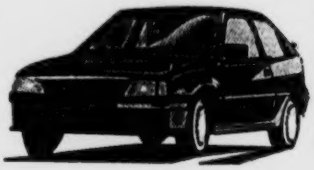
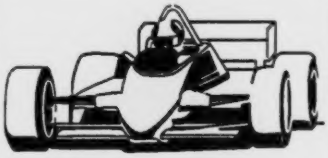
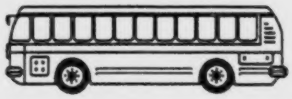
Name____ Date______________________

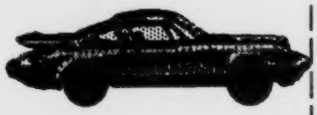
Worksheet:
Making Sets

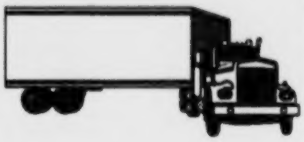
Here are the cars to cut out and place on the previous page.

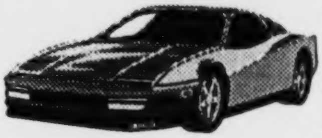












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MEASURING LENGTH

Subject:
MATHEMATICS

Grade Level:
K - 2

Concept Statement

Length is an attribute (characteristic) used to compare objects.

Instructional Objectives

The student will:

- Compare pairs of words according to their length.
- Determine if a word is too long, too short, or just right to fit into a given space.
- Compose a brief biography of themselves.

African American Role Models

Identify Maya Angelou, Charles Johnson, and Toni Morrison as authors.

Affective Factors

- *Influence of Significant Others* - Teachers, parents, and peers have a role in shaping students' attitudes toward learning.
- *Perceived Utility* - These writers use and arrange words to compose stories.

Materials

3" x 5" index cards (unlined)
8 1/2" x 14" paper
Crayons
Grid paper
Paste, glue, or tape
Scissors
Story strips (see pages M-28 through M-29)

Vocabulary

Compare
Equal
Greater than
Length
Less than
Longer
Longest
Shorter
Shortest

Teaching Procedures

- Display several pairs of word strips on chart paper, construction paper, or on the chalkboard. Align pairs of words so that they are even on the left side. Ask students "Which is longer?" "Which is shorter?" and "How do you know?" Repeat with other pairs and repeat with triples. Make some words of equal length. Distribute the worksheet, ***Comparing Word Lengths*** (pages M-18 through M-20).

- Have students work in pairs to cut out the words on the grid paper and place them in the correct row. Distribute the worksheet, ***Too Long, Too Short, or Just Right?*** (pages M-21 through M-26).
- Read to the students the biographies of ***Maya Angelou: Author*** (pages M-13 through M-14), ***Charles Johnson: Author*** (page M-15) and ***Toni Morrison: Author*** (pages M-16 through M-17). Briefly discuss what a biography is. Ask students why it is important to know how to write.
- Duplicate the worksheet, ***My Story*** (page M-27) onto 8 1/2" x 14" paper. Distribute a copy to each student along with a copy of the ***Story Strips*** (pages M-28 through M-29). Have the student print his or her first name in strip #4 and his or her age in strip #8 using one letter or number per box. Have the students cut out the words and follow the directions on the worksheet, ***My Story***. Distribute index cards to students. Have the students draw a picture of themselves as part of this worksheet.

Follow-up Activities

The student may:

- Compare the length of selected words in their spelling lists, reading books, etc.
- Make bar graphs of favorite stories, favorite authors, most books read, etc. using strips made from grid paper; compare lengths of bars.
- Visit the school library and select books to read; determine which book has the shortest title, which author has the longest name, which book is the longest, and which book is the widest.

Resources

Angelou, Maya. *Just Give Me a Cool Drink of Water 'Fore I Diiie.* New York: Bantam Books, 1973.

Davis, Marianna. (Ed.) *Contributions of Black Women in America.* Columbia, S.C.: Kenday Press, Inc., 1982.

Ginsberg, Dale Ann. *Black History, Black Lives: A Comprehensive List of Black Biographies For Young People Arranged by Birthdate.* Merion Station, PA: Anndale Books, 1986.

Lanker, Brian. *I Dream a World: Portraits of Black Women Who Changed America.* New York: Stewart, Tabori & Chang, 1989.

Morrison, Toni. *The Bluest Eye.* New York: Pocket Books, 1976.

Morrison, Toni. *Song of Solomon.* New York: New American Library, 1977.

Peters, Margaret. *The Ebony Book of Black Achievement.* (First Edition) Chicago: Johnson Publishing Co., 1970.

Ploski, Harry A. and James Williams. (Eds.) *The Negro Almanac: A Reference Work on the African American.* (Fifth Edition) Detroit: Gale Research Inc., 1989.

Biography:

Marguerite Johnson (Maya Angelou):

Author

(1928-   )

Maya was born in St. Louis, Missouri. When she was three, she went to live with her grandmother in Stamps, Arkansas. Her Grandma taught her to read, by reading her many books written by African Americans.

While living with her grandmother, Maya had a bad experience with a dentist. The dentist was White. The dentist did not want to take care of Maya because she was Black. Maya was sad. Maya wished she could be White. She did not want to have beautiful curly black hair. She wished her hair was straight and blonde.

Soon Maya had another birthday. She was now eight years old. She was very happy to be eight years old. But one day, when she was eight, something bad happened. What happened to Maya was so bad that she would not talk. She did not talk again until she was thirteen years old. What do you think happened? What could be so bad that it would make Maya not want to talk for five years?

When Maya was eight years old someone made her feel bad inside. This man was her mother's friend. Her mother's boyfriend touched Maya in her private parts. This man did things to Maya that made Maya feel sad in her stomach. And that is why Maya felt sad inside. She felt so sad that she did not talk for five years.

Grandma helped Maya to talk again. Grandma and Mrs. Flowers, a neighbor who lived close to Maya's house, helped Maya feel better inside. Mrs. Flowers helped Maya feel like she could do many things. Maya felt she could be whatever she wanted to be when she got older.

Maya worked hard in school. She graduated from 8th grade at the top of her class. She got the best grades! Later, she went to live with her

Continued on next page

mother in San Francisco. San Francisco is in California. In California, Maya took dance lessons and acting lessons. She liked to work hard. Maya liked to learn new skills.

When Maya got older she used her new skills in different places. She danced and acted in Europe and Africa. She wrote many books too! Maya likes to write. She writes poetry. She also writes about her life. Maya now lives in North Carolina. She liked learning new things so much that she now teaches other people to do things that she can do.

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Biography:

Charles Johnson:

Author

(1948-)

Charles loved his father. He looked up to his dad. Charles' dad worked very hard. He worked night and day. During the day, Charles' dad worked in construction. At night he worked as a nightwatchman. During weekends, Charles' dad worked as a driver. He drove cars for White families. He worked hard to support his family.

Charles' mother wanted to become a teacher. His mother could not become a teacher because she got ill a lot. But she could still read. She filled the house with books. Charles loved to read too. He read at least two books every week. His mother gave Charles a diary. A diary is a book with blank pages. She encouraged Charles to write. She also encouraged him to draw.

Charles started to work hard in school when he was a junior in high school. He was in his third year in high school. He joined the school newspaper. He drew for the newspaper. He was the school newspaper's cartoonist. He was the only African American on the newspaper. His first cartoon was published when Charles was only 17 years old.

After graduating from high school, Charles went to college. He studied writing. And he continued to draw. After graduating from college, Charles went to graduate school. He studied philosophy. He wanted to study philosophy more than writing. When you study philosophy you ask a lot of questions. Charles loved to ask many questions.

After college, Charles wrote or drew pictures and cartoons for seven books. He made a TV show about drawing called "Charlie's Pad." Charles has received honors for some of his books. He still writes today. He also teaches English at the University of Washington in Seattle.

Biography:

Chloe Anthony (Toni) Wofford Morrison:

Author

(1931-   )

Her parents named her Chloe Anthony Wofford Morrison. She was born the second of four children.

Chloe's father was a hard worker. He was a welder. A welder is a person who works with metals and heat. Chloe's father sometimes worked on ships. He felt very good about the work he did on these ships. Sometimes he wrote his name on the ships he worked on. Chloe's father had two other jobs too. For seventeen years, he worked three jobs.

When Chloe was growing up, the United States was in a depression. The Depression meant that many families did not even have enough food to eat. Because of the Depression, Chloe's family had a hard time. They did not have enough food to eat. The had to get food. They needed to eat. They had to accept help from the government. The government gave them food to eat. Sometimes the government gave them corn meal.

One time the government gave them more than corn meal. When Chloe's mother opened the corn meal, she found more than corn meal. Bugs! There were bugs in the corn meal! Ugh! Chloe's mother was very upset. She was angry. She wrapped up the corn meal. And she wrote a letter. She wrote a letter to the president of the United States. She said, " Dear Mr. President Franklin D. Roosevelt: There are bugs in my corn meal. I am sending them to you."

Chloe's grandmother read to Chloe. She taught Chloe to read. Chloe learned to read before she went to school. She was the only first grader who knew how to read at the beginning of the year. Chloe liked to read. She liked to read about Russia the best. Chloe dreamed of being a Russian ballet dancer when she got older.

Continued on next page

Instead, when she got older she went to high school. In high school Chloe worked hard. She got good grades. She graduated with honors. After high school, Chloe went to college. She went to Howard University in Washington, D.C. In college she studied English and Writing. She also changed her name to Toni because no one could pronounce her name.

Toni is now a famous writer. She has written many books. She has also received many honors.

Name ______________________________ Date ________________

Worksheet:

Comparing Word Lengths

1. Place an **X** in front of the longer word.

h	a	n	d		

l	e	g			

2. Place an **X** in front of the shorter word.

d	e	s	k		

s	c	h	o	o	l

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Name________________________________ Date__________________

3. Place an **X** in front of the shorter word.

n	u	m	b	e	r	s

l	e	t	t	e	r	

4. Place an **X** in front of the longest word.

c	o	a	t			

s	h	o	e	s		

h	a	t				

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Name______________________________________ Date____________________

5. Place an **X** in front of the shortest words.

m	o	t	h	e	r	
b	r	o	t	h	e	r
s	i	s	t	e	r	s
f	a	t	h	e	r	

6. Tell how you decided which word lengths were longer? shorter? longest? shortest? the same?

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Name__________________________________ Date____________________

Worksheet:

Too Long, Too Short, or Just Right?

Cut out the words on this page and place them on the correct row of your worksheet.

s	t	o	v	e		
e	y	e				
p	u	p	p	y		
f	l	o	w	e	r	

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Name ______________________________ Date ________________

Worksheet:

Too Long, Too Short, or Just Right?

s	t	o	r	e		
p	o	t	a	t	o	
r	i	n	g			
c	o	u	n	t	e	r

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Name ______________________ Date ______________

Worksheet:

Too Long, Too Short, or Just Right?

s	h	i	r	t		
n	o	s	e			
h	o	u	s	e		
p	e	n	c	i	l	

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Name ______________________________ Date ______________

Worksheet:

Too Long, Too Short, or Just Right?

b	e	l	l			
s	o	n	g			
s	t	r	e	e	t	
j	a	c	k	e	t	

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Name ________________________________ Date __________________

Worksheet:

Too Long, Too Short, or Just Right?

h	a	p	p	y		
c	a	t				
b	u	s				
b	e	d				

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Name ______________________ Date ______________

Worksheet:

Too Long, Too Short, or Just Right?

Compare the word lengths you cut out to the word length below and place it in the correct row.

r	i	c	e

Too Long

Too Short

Just Right

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Name ______________________ Date ______________

Worksheet:

My Story

Glue your picture and your story strips so that your picture and story all fit on this paper.

Worksheet:

Story Strips

Print your name on strip #4. Then cut out all the words on this page and place them on your worksheet, ***My Story***.

1 M	y		2 n	a	m	e
3 i	s					
4						

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Worksheet:

Story Strips

Print your age on strip #8. Then cut out all the words on this page and place them on your worksheet, ***My Story***.

5 a	n	d		6 I		
7 a	m		8			
9 y	e	a	r	s		
10 o	l	d	.			

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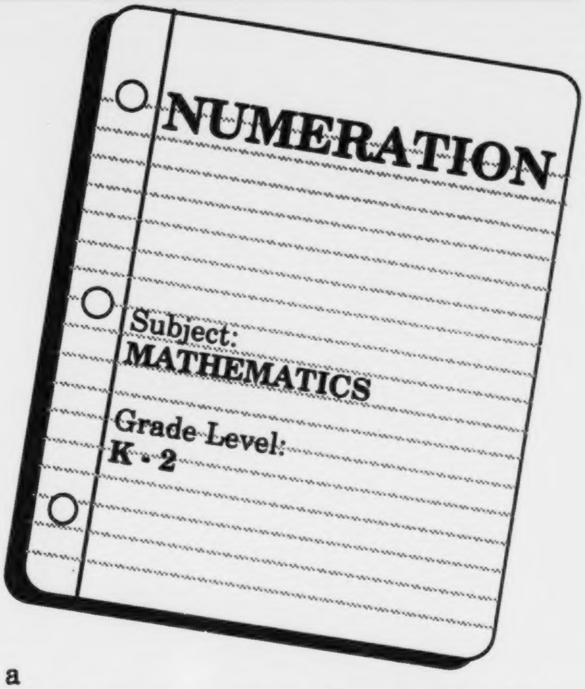

NUMERATION

Subject:
MATHEMATICS

Grade Level:
K - 2

Concept Statement

Numbers are used to measure quantities.

Instructional Objectives

The student will:

- Identify, read, and write the numeral associated with a set of objects (up to 10 objects for this lesson, although first graders can go up to 100).
- Add and subtract sets of objects.
- Name at least 10 products, developed from the peanut, by George Washington Carver.

African American Role Model

The student will:

- Identify Dr. George Washington Carver as a botanist, chemist, and agricultural scientist who created a number of innovations that improved farming, and who developed many products from cotton, the peanut, the pecan, and the sweet potato.

Affective Factors

- *Perceived Utility* - By reading about Dr. George Washington Carver's contributions to society, the student will understand how the study of science can be applicable to everyday life and valuable to his or her future schooling and jobs. The student will also identify the usefulness of the various products developed from the peanut.
- *Attitude* - To identify and reinforce positive attitudes toward the study of plants and animals.

Materials

Numeral cards (3" x 5" index cards cut in half)
Peanuts and products developed from the peanut

Vocabulary

Agricultural scientist
Botanist
Chemist
Crop Rotation
Peanut
Products

Teaching Procedures

- Have students make their own numeric cards. Give each student 5 index cards. Tell them to cut the cards in half and write numerals 1 - 10 on them (one numeral per half of card).
- Display different objects from the room and some of the products developed from the peanut on a table or desk where the students may observe these objects as you name them. Consider asking the students if they can name the products or objects. As you name sets of objects, the students should hold up a numeric card to match the number of objects named.
- Read to students the biography, ***Dr. George Washington Carver: Scientist*** (page M-34), and distribute his photograph (page M-35). Read and discuss the handout, ***Definitions: Agricultural Scientist, Botanist, and Chemist*** (page M-36). Discuss with students what plants or animals they have seen and which one they like the most. Discuss with students what they need to know to become an agricultural scientist, botanist, or chemist.
- Have students complete worksheets: ***How Many Peanuts?, Adding Peanuts,*** and ***Subtracting Peanuts*** (pages M-37 through M-39). Provide opportunities for students to explain or justify their responses and have them model the process prior to moving to the abstract of recording symbols.
- Discuss with students the handout, ***Products Developed from the Peanut*** (page M-40). Have the students classify the products on worksheet, ***Products Made from the Peanut*** (page M-41), as those we can eat, those that help with work, and those that can be used to make things look better. Write them in groups on the board or chart paper. Have the students tell how many there are in each category. Encourage students to classify the objects, then have the students or the teacher describe the attribute(s) or the "rule" for the classification.
- Erase the board and have students name 10 products from memory.
- Have students make peanut butter and eat it with crackers as a treat. See ***Recipe for Peanut Butter*** (page M-42).

Follow-up Activities

- Students may find pictures of peanut products in magazines and newspapers to make a scrapbook. This could also be done at home.
- As a science lesson, make the oil test (mix oil with water) and find out why peanut oil is such a good product.

Resources

Carwell, Hattie. *Blacks in Science: Astrophysical to Zoological.* New York: Smithtown Exposition Press, 1977.

Clift, Virgil A., and W.A. Low. *The Encyclopedia of Black America.* New York: DaCapo Press, 1984. (Paperback Reprint)

Coil, Suzanne M. *George Washington Carver.* New York: Franklin Watts, 1990.

Kenda, Margaret and Phyllis Williams. *Barrons Cooking Wizardry for Kids.* Hauppauge, New York: Barrons Educational Service, Inc., 1990.

Means, Florence Crannell. *Carvers' George.* Marshall Cavendish (Ed.) Lakeville, CT. 1990.

Sammons, Vivian O. *Blacks in Science and Medicine.* New York: Hemisphere Publishing Corp., 1990.

Wyler, Rose. *Science Fun with Peanuts and Popcorn.* New York: J. Messner, 1986.

Biography:

Dr. George Washington Carver:

Scientist

(1864-1943)

George Washington Carver, although born enslaved, became a very famous and important scientist. He had a special interest in plants when he was young. He liked to grow and care for plants so much that people called him the "Plant Doctor." He studied very hard in school, especially mathematics and science. He wanted to go to college and study plants and that is exactly what he did! He went to college and studied agriculture. He learned about farming, plants, and different types of soil.

In 1896, Dr. Carver became Director of Agricultural Research at Tuskegee Institute, a Black university in Alabama. He worked there for 50 years. He became a very famous botanist, chemist, and agricultural scientist. He studied botany, chemistry, and agriculture because he wanted to help farmers. Many farmers had ruined their soil because they planted cotton year after year. He developed farming methods that did not waste the land and leave people hungry. He taught the farmers how to be better farmers. Dr. Carver also taught farmers to plant peanuts and sweet potatoes some years so that the soil would get better again. This process is called crop rotation. Dr. Carver was very creative. He is famous for developing many uses of the peanut, the sweet potato, the pecan, and cotton.

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Dr. George Washington Carver

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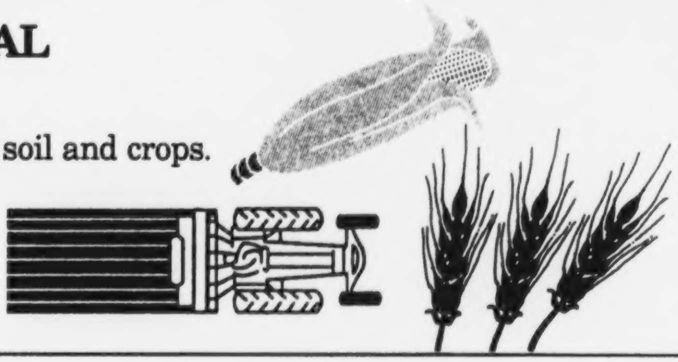
Handout:

Definitions

AGRICULTURAL SCIENTIST

A person who studies soil and crops.



BOTANIST

A person who specializes in the study of plants.

CHEMIST

A person who studies the make-up of matter such as gases, hard and soft objects, and liquids.

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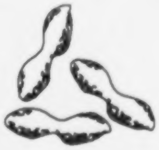
Name ______________________________ Date ________________

Worksheet:

How Many Peanuts?

1. Circle the correct number that tells how many peanuts are in each picture.



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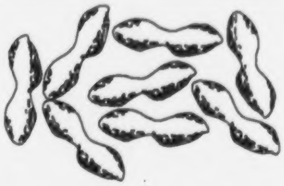
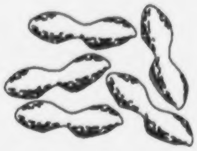
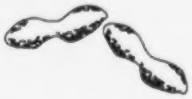


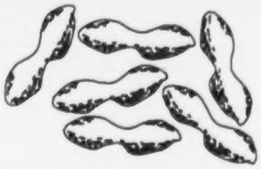
6 5 8



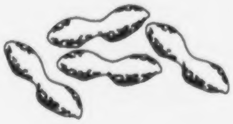
5 9 4



2 5 3

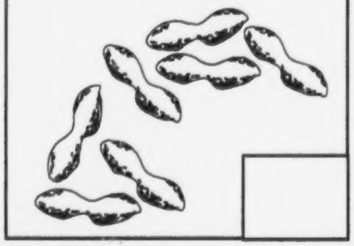


6 1 4



4 7 2

2. Write the correct number that tells how many peanuts there are in each picture.



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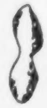

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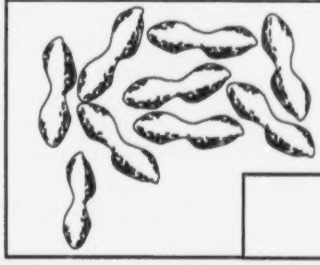

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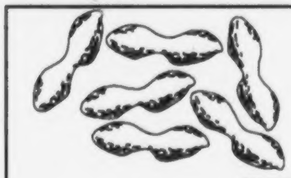

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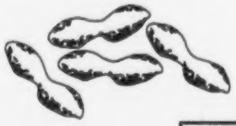

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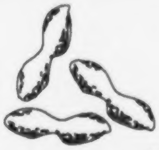

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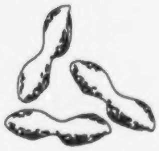
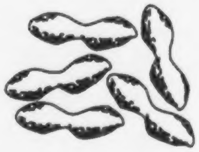
Name ______________________ Date ______________

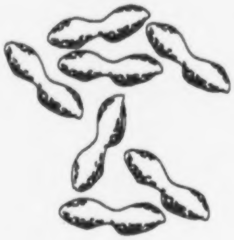
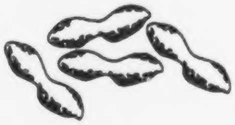
Worksheet:

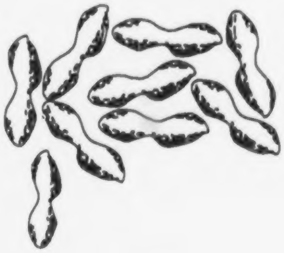
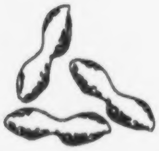
Adding Peanuts

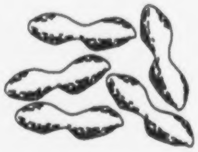
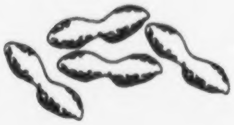
One of the things addition can tell you is how many you have when you put two or more sets of objects together.

Add the sets of peanuts:

 +  = ____________

 +  = ____________

 +  = ____________

 +  = ____________

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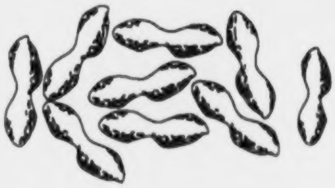
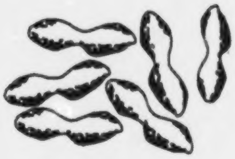
Name ______________________________ Date ________________

Worksheet:

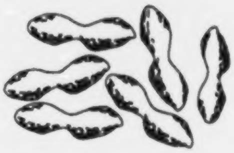
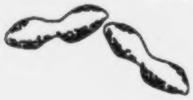
Subtracting Peanuts

One of the things subtraction can tell you is how many are left when part of a set is taken away.

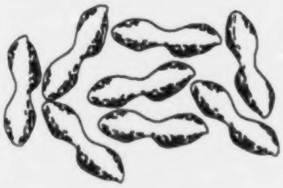
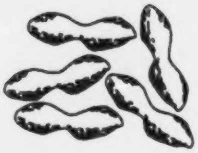
There are 9 peanuts. If you eat 6, how many are left?

 −  = ________________

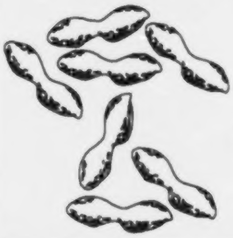
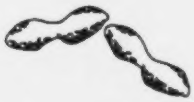
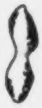
Sue has 6 peanuts. If she eats 2, how many are left?

 −  = ________________

John has 8 peanuts. He gives 5 to Maria. How many does John have left?

 −  = ________________

Leah has 7 peanuts. She gives 2 to Seth and 1 to Cyrus. How many does Leah have left?

 −  −  = ________________

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Handout:

Products Developed from the Peanut

adhesives
axle grease
bleach
buttermilk
cheese
chili sauce
cream
dyes
flour
ink
instant coffee
insulating board
linoleum
mayonnaise
meat tenderizer
metal polish
mucilage
paper
rubbing oils
salve
shampoo
shaving cream
shoe polish
soil conditioner
sugar
talcum powder
wood filler
wood stains
Worcestershire Sauce

This list does not include the products with the word "peanut" such as: peanut butter, peanut oil, or peanut brittle. The teacher may extend the list.

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Name ______________________________ Date ________________

Worksheet:

Products Made from the Peanut

Those We Can Eat	*Those That Help With Work*	*Those That Can Be Used to Make Things Look Better*

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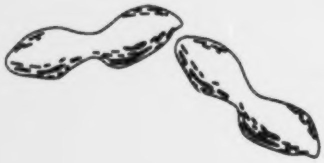
Handout:

Recipe for Peanut Butter

Ingredients:



1 1/2 cups of unsalted, roasted peanuts
1 tablespoon of peanut or vegetable oil

1. Set aside a few peanuts (about 1/4 cup). These will be used to make the peanut butter chunky.

2. Mix the remaining peanuts with the oil in a food processor until the mixture is smooth.

3. Stir in the peanuts set aside earlier. This recipe makes about 1 cup of peanut butter.

4. Store the peanut butter in the refrigerator. It will keep for two weeks in a sealed container.

Source: *Barrons Cooking Wizardry for Kids* by Margaret Kenda and Phyllis Williams. Hauppauge, NY: Barrons Educational Services, Inc., 1990.

MEASURING TIME
(Lesson 1)

Subject:
MATHEMATICS

Grade Level:
K - 2

Concept Statement

Clocks and watches are instruments used for measuring time.

Instructional Objective

The student will:

- Identify how clocks and watches are used.

African American Role Model

The student will:

- Identify Benjamin Banneker as a scientist who invented the first wooden striking clock in the United States.

Affective Factors

- *Perceived Utility* - Students will become aware of the clock's usefulness in everyday activities.
- *Stereotyping* - Understanding the contributions of Benjamin Banneker as a scientist, writer, and surveyor helps students to see themselves in these fields.
- *Attitude* - To help students maintain positive attitudes toward science and mathematics by identifying how these disciplines are and have always been an important part of the Black culture and community.

Materials

Crayons
Inside of clock or watch (if possible)
Models of clocks, timers, watches
Paper fastener or brad for each student
Paper plates
Paste or glue
Pictures of clocks, hourglasses, timers, watches
Scissors

Vocabulary

Analog
Digital
Hourglass
Measure
Sundial
Timer

Teaching Procedures

- Discuss with the students which instruments we use to measure time and how we tell time. Allow them to give many responses such as clock, watch, timer, calendar, etc.

- Display models of different timers, clocks, watches, hour glasses, if available. If not, use pictures of the same. The handout, ***Instruments for Measuring Time*** (page M-46), can also be distributed. Discuss which pieces may have been used long ago and which are more modern. Discuss also how each is or was used.
- Discuss with the students the need for the types of clocks we have now. Show that a digital clock displays the time precisely as we read it. Examine the different sizes and shapes.
- Discuss with students the concept of standard and military times.
- Read to students the biography, ***Dr. Benjamin Banneker: Scientist*** (page M-47). Discuss with students what they need to do to become an astronomer, inventor, or scientist. Show the portrait, ***Dr. Benjamin Banneker and His First Wooden Clock*** (page M-48). Have students color this picture with crayons.
- Direct the students in creating their own clocks on worksheet, ***Constructing a Model of a Clock*** (page M-49). Duplicate this worksheet onto heavy card stock. Distribute fasteners.

Follow-up Activities

The student may:

- Identify Aaron Lufkin Dennison as an early watchmaker.
- Cut out pictures of clocks and watches from magazines and newspapers and paste on construction paper.
- Identify rooms in the home where clocks and watches are used.
- Identify persons in the family who need a clock or watch during the day. Explain why.
- Plan a trip to the National Museum of American History, the Naval Observatory in Washington, D.C., or a local museum to see the exhibit of clocks and other time instruments.
- Make a timeline scrapbook of drawings or pictures illustrating important events in the student's life.

Resources

Aust, Siegfried. *Clocks!: How Time Flies.* Minneapolis: Lerner Publications, 1991.

Conley, Kevin. *Benjamin Banneker.* New York: Chelsea House Publishers, 1989.

Darling, David. *Could You Ever?: Build a Time Machine.* Minneapolis: Dillon Press, 1991.

Ferris, Jeri. *What Are You Figuring Now?: A Story About Benjamin Banneker.* Minneapolis: Carolrhoda Books, 1989.

Green, Richard L. (Ed.) *A Salute to Historic Black Firsts.* Chicago: Empak Publishing Company, 1989.

Ives, Patricia Carter. *Creativity and Inventions: The Genius of Afro-Americans and Women and Their Patents.* Arlington, VA: Research Unlimited, 1987.

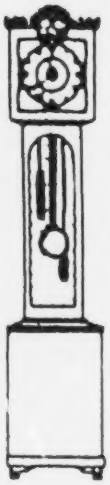
Lee, George L. *Interesting People: Black American History Makers.* Jefferson, NC: McFarland, 1989.

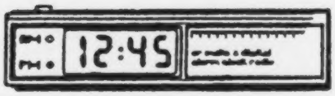
McMillan, Bruce. *Time To—.* New York: Lothrop, Lee & Shepard Books, 1989.

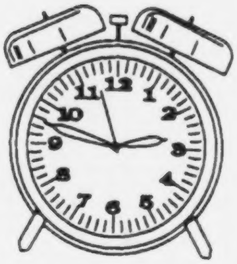
My First Look at Time. New York: Random House, 1991.

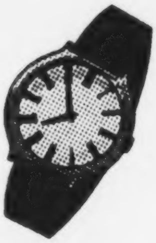
Handout:

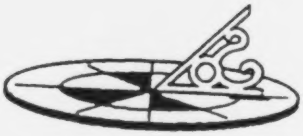
Instruments for Measuring Time

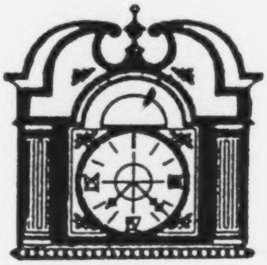












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Biography:

Dr. Benjamin Banneker:

Scientist

(1731 - 1806)

When he was a very young man, Benjamin Banneker built the first wooden striking clock made in America, although he had no tools except a pocket knife. He made such a good clock that it kept perfect time for twenty years. As a young child he had been fascinated with mathematics and science so he studied and read books all the time. He later wrote a book called an almanac. An almanac is a very useful book which forecasts weather and also includes information on science and previous weather facts. Benjamin's almanac also listed useful information on medicines. This was the first known scientific book written by an African American.

Benjamin Banneker was also a surveyor. A surveyor is someone who studies cities. President George Washington had asked Pierre L'Enfant, a Frenchman, to design the city of Washington, D.C. However, George Washington and Pierre L'Enfant disagreed over the plans and L'Enfant went back to France with his plans. Benjamin Banneker had seen these plans for the city and had memorized them. He was able to use his memory and surveying skills to help others build the nation's capitol.

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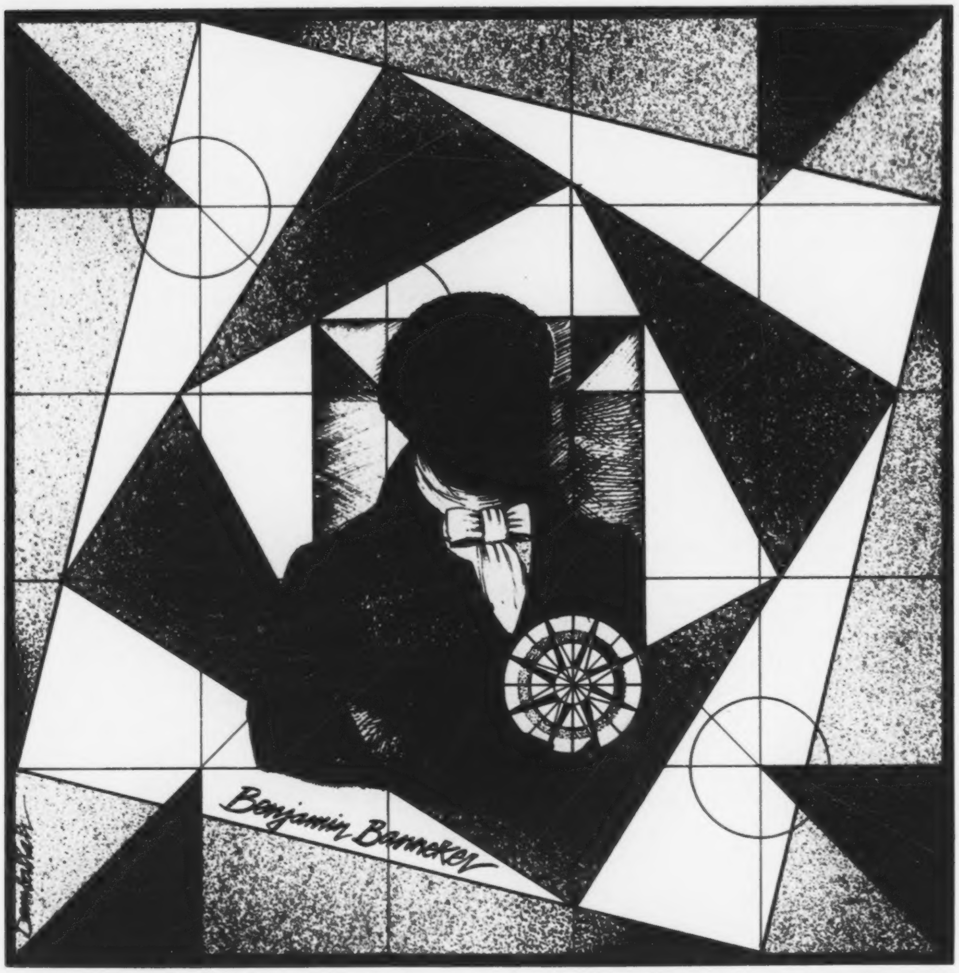
Dr. Benjamin Banneker and His First Wooden Clock



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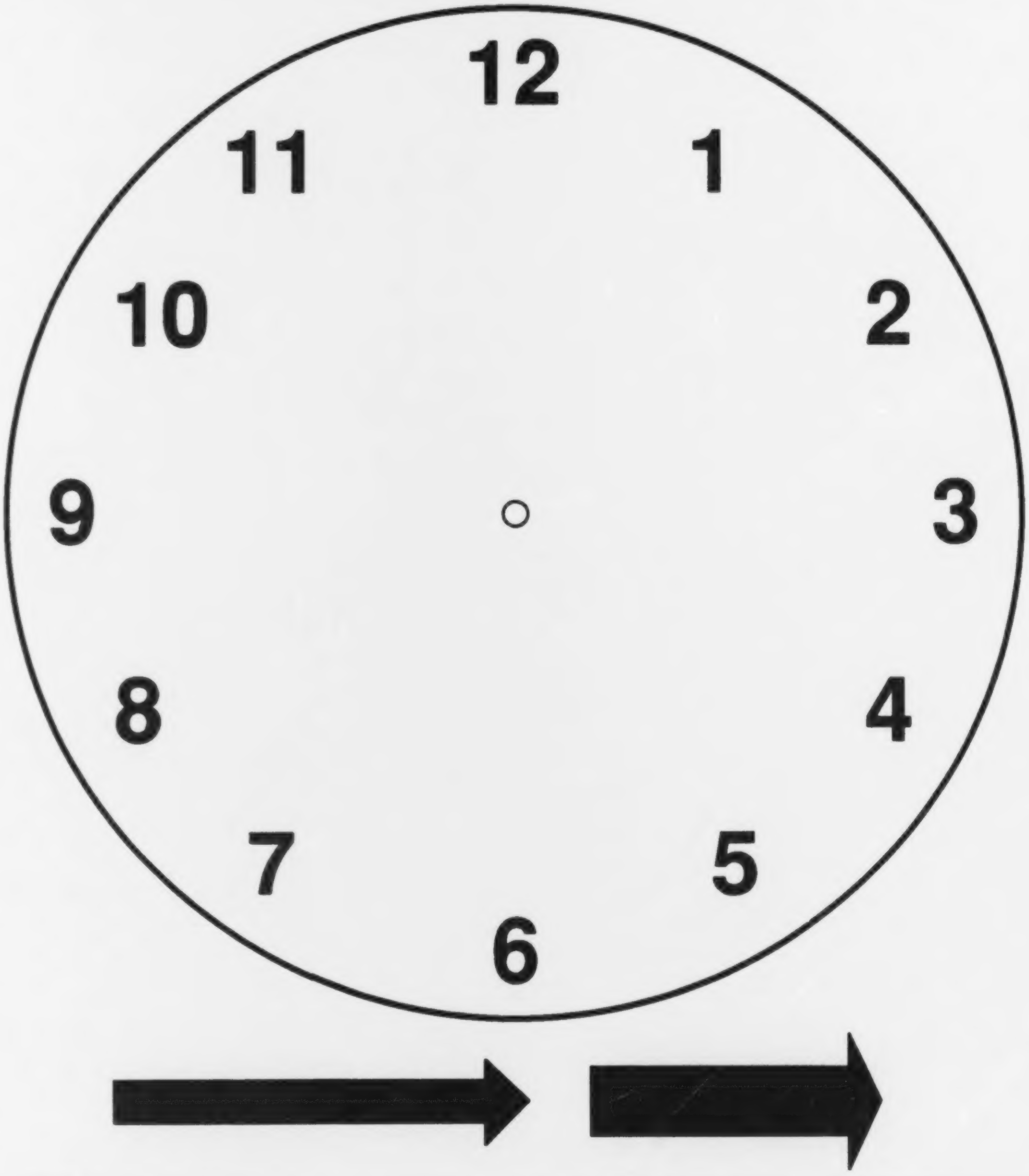
Name ______________________________ Date ________________

Worksheet:

Constructing a Model of a Clock

Using your scissors, cut out the clock face and hands, and build a clock with the fastener your teacher will give you.



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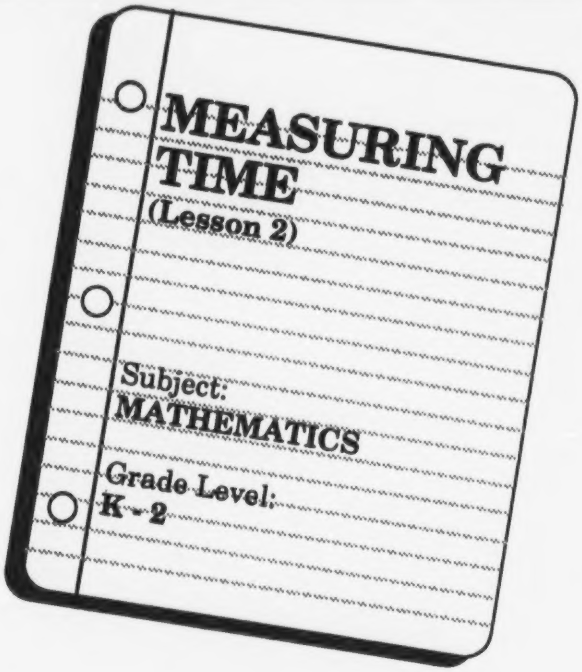


MEASURING TIME

(Lesson 2)

Subject:
MATHEMATICS

Grade Level:
K - 2

Instructional Objective

The student will:

- Measure time on the clock by the hour.

Materials

Clocks constructed by the students
Demonstration clock for the teacher

Vocabulary

Clockwise
Counter clockwise
Hour hand
Long
Minute Hand
O'clock
Short

Teaching Procedures - Lesson 2

- Demonstrate the use of the long hand as the minute hand, and the short hand as the hour hand on the teacher demonstration clock.
- Have the students move the minute hand of their clock to different numbers on the clock. The movement should be clockwise first. Point out that each little line segment on the clock stands for a minute. Repeat with the movement of the hour hand. Show that movement in the opposite direction is called counter-clockwise.
- Show 2 o'clock on the demonstration clock. Ask the students if they know the time. Ask "Where is the hour (short) hand pointing? Where is the minute (long) hand pointing?" Tell the students when the minute hand points to 12 and the hour hand points to a specific number, it is that specific number "o'clock." In this case, it is 2 o'clock.
- Have the students with one hand hold the minute hand on 12 and with the other hand move the hour hand to designated numbers. Allow the students to name the time after each hour hand movement.
- Discuss how the clock can show morning, noon, afternoon, evening, and night. Demonstrate which hours are in each part of the day. Discuss the difference between A.M. and P.M.
- Ask the students about different events during the day. When are you at school? When are you at home? When do you sleep? The responses should be: morning, noon, afternoon, evening, or night.
- Discuss with the students what time of day Benjamin Banneker probably did most of his work on the clock. Have them give reasons.

- Have the students show on their clocks: when they get up in the morning, when school opens, when school ends, when they eat lunch, breakfast, dinner, and when they go to bed at night.
- Have the students complete worksheets, ***Draw the Hour Hand*** (page M-53) and ***What Time Is It?*** (page M-54).

Follow-up Activities:

- Play the game, *'CLASSROOM CLOCK'* - Identify 12 students as numbers (1-12) to stand in a circle. Identify another student as the clock hands who stands in the center of the circle. Designate the right and left hands of the center student as clock hands (one hand is the hour hand and the other hand is the minute hand). Say, "Show 3 o'clock." The center student must point to the correct numbers with the correct hands. The students forming the circle may hold cards with their designated numbers, or they may have the numbers pinned on them. Other students in the class should be given an opportunity to play the game.
- Play the game, *'CLASSROOM CRIER'* - Identify students in the class as different school hours, 9:00 - 3:00. When the hour comes, the student named for that hour must stand and say, "It is ___ o'clock and all is well." This repeats for each hour.
- Consider a simple exercise, perhaps a question, related to elapsed time.
- Keep a daily log by the hour. This may be done on the chalkboard or on chart paper.

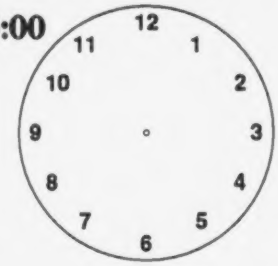
Name ______________________________ Date ________________

Worksheet:

Draw the Hour Hand

Draw an hour hand on each clock face to show the correct time.

5:00



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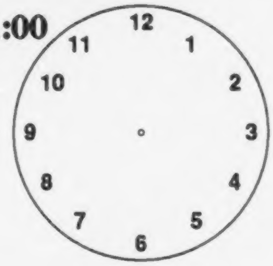
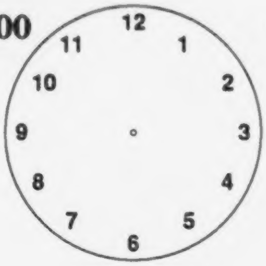


2:00



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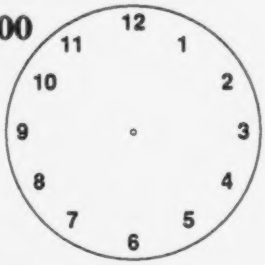
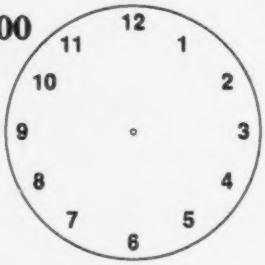
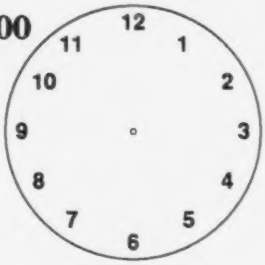


4:00



9:00



Write the number for the hour shown.

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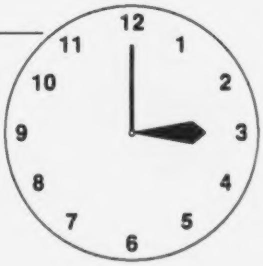

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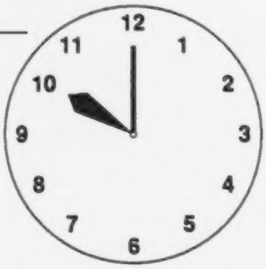

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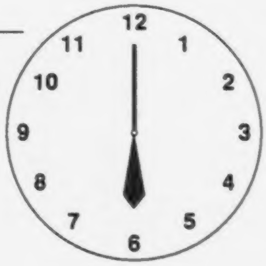

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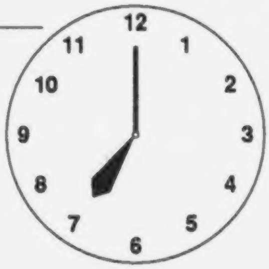

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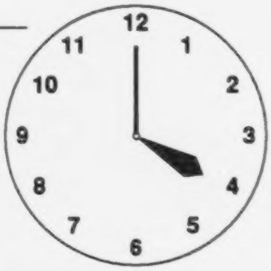

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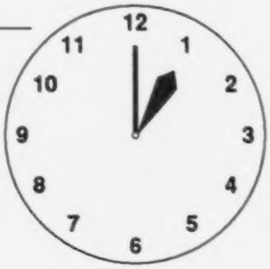

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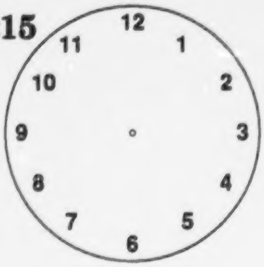
Worksheet:

What Time Is It?

Draw the hands on each clock face to show the correct time.

11:15



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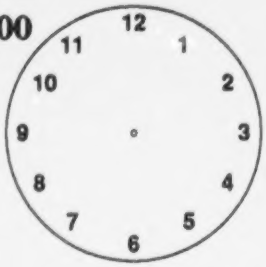

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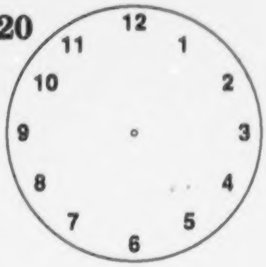

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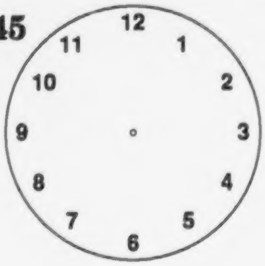

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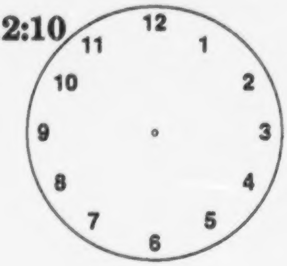
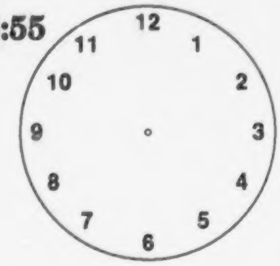


5:55



Write the number for the hour shown.

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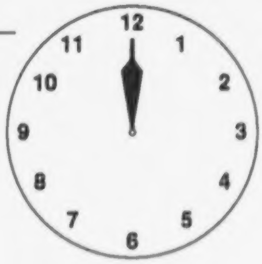

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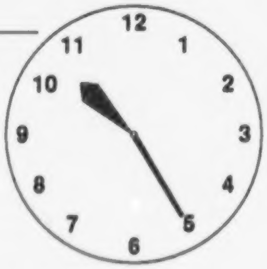

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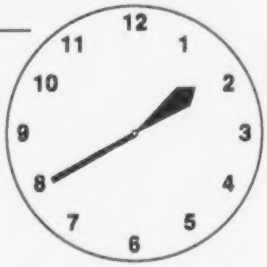

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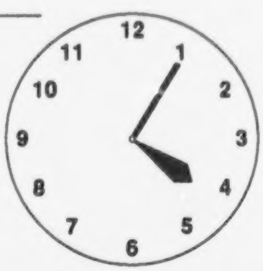

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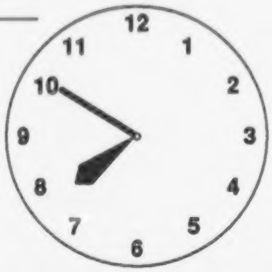

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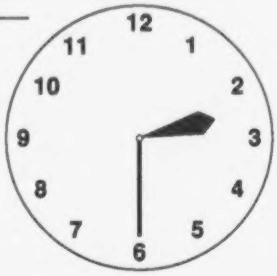

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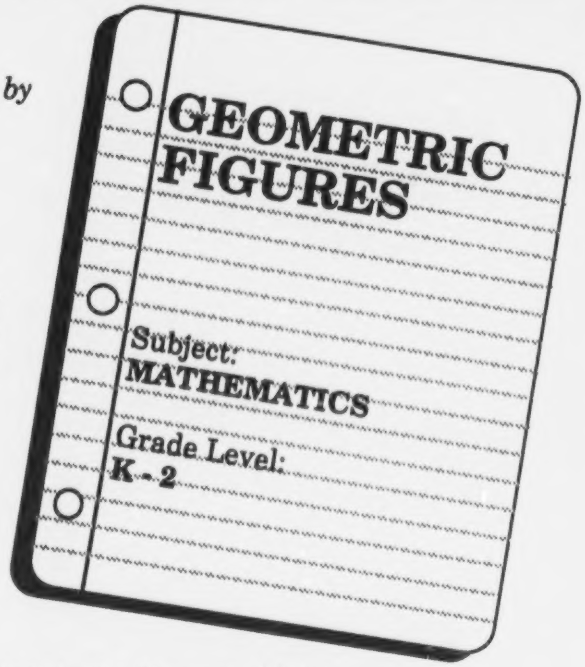


GEOMETRIC FIGURES

Subject:
MATHEMATICS

Grade Level:
K - 2

Concept Statement

Geometric shapes (polygons) are identified by the number of sides and angles.

Instructional Objectives

The student will:

- Identify geometry as the branch of mathematics that deals with the measurement and relationships of points, lines, and angles.
- Identify triangles, squares, rectangles, pentagons, hexagons, and circles as geometric shapes.

African American Role Models

The student will:

- Identify Dr. Charles Turner as an entomologist who discovered how bees are attracted to flowers.
- Identify Shirley Mathis McBay as a mathematician.

Affective Factors

- *Perceived Utility* - Geometric shapes are studied in mathematics. Examples of these shapes are found in objects all around us. Geometric shapes are used in architecture. Bees instinctively use geometric shapes in building beehives.
- *Persistence* - Emphasize the importance of staying in school.
- *Influence of Significant Others* - Teachers, parents, and peers have a role in shaping students' attitudes toward both the usefulness of mathematics and science as well as the student's own skill in these areas.

Materials

Cut-out pictures of bees
Cut-out triangles, squares, rectangles, pentagons, hexagons, and circles

Vocabulary

Beehive
Cell
Circle
Entomologist
Geometry

Hexagon
Pentagon
Rectangle
Square
Triangle

Teaching Procedures

- Show assorted geometric shapes (circles, squares, triangles). Identify the differences by counting the sides. Name each figure as it is displayed.
- Distribute worksheet, ***How Many Sides Does Each Geometric Figure Have?*** (page M-58). At a later time or date, have them complete worksheet, ***Drawing Geometric Figures*** (page M-59).
- Discuss with the students how bees form honey, spread pollen, and get nectar. Discuss how they build their hives in cells shaped as six-sided figures called hexagons.
- Display bee pictures. Discuss some of their characteristics. Label body parts. Ask the students if they know the title or name of the person who studies insects. Introduce the word entomologist.
- Discuss with the students how bees convey messages to other bees about where nectar can be found by flying in straight line, angle, or circle patterns. The straight lines show the directions to take. Either visit the school library with the students and together read about bees in the encyclopedia, or assign reading to students as homework. In either case, write down information gathered from the encyclopedia on worksheet, ***Important Facts About Bees*** (page M-60) and discuss.
- Read to the students the biography, ***Dr. Charles Turner: Entomologist*** (page M-61). Write the three most important facts about Dr. Turner's discoveries:

  A. Bees are attracted to flowers by odor.
  B. Bees are attracted to flowers by color.
  C. Bees are attracted to flowers by floral patterns.
- Read to the students the biography, ***Dr. Shirley Mathis McBay: Mathematician*** (page M-62), and distribute her photograph (page M-63). Discuss with students the importance of studying and doing well in school despite what their friends think. Discuss Dr. McBay's successes.

Follow-up Activities

- Contact the biology department of a local university or the government for possible field trips to sites for bee studies.
- Find pictures and identify flowers that have a design pattern of six; for example, the center of Day Lilies form a six sided star.

Resources

The Big Book. The 1981 Childcraft Annual. Chicago: World Book Encyclopedia, Inc., 1981.

Feldman, Judy. *Shapes in Nature.* Chicago: Children's Books, 1991.

My First Look at Shapes. (First American Edition) New York: Random House, 1990.

Petty, Kate. *Bees and Wasps.* New York: Gloucester Press, 1987.

Rogers, Paul. *The Shapes Game.* (First American Edition) New York: H. Holt, 1990.

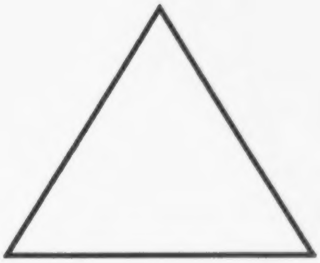
Sammons, Vivian O. *Blacks in Science and Medicine.* New York: Hemisphere Publishing Company, 1990.

Verheyden-Hilliard, Mary Ellen. *Mathematician and Administrator, Shirley Mathis McBay.* Bethesda, MD: The Equity Institute, 1985.

Name ______________________________ Date ____________________

Worksheet:

How Many Sides Does Each Geometric Figure Have?



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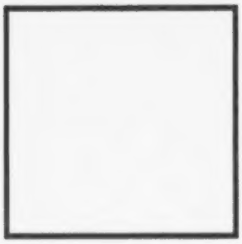
Triangle



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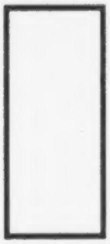
Square



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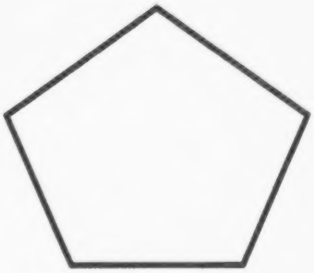
Rectangle



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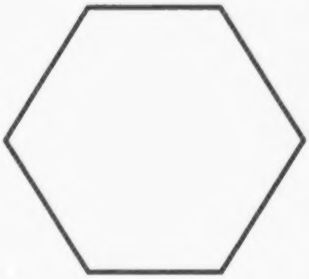
Pentagon



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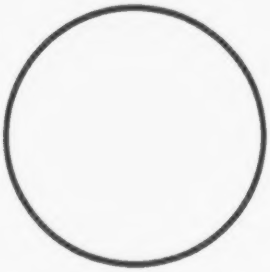
Hexagon



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Circle

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Name ______________________________ Date ________________

Worksheet:

Drawing Geometric Figures

Draw the geometric figures. Write down how many sides each one has.

Triangle

____

Square

____

Rectangle

____

Pentagon

____

Hexagon

____

Circle

____

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Name ______________________________ Date ________________

Worksheet:

Important Facts About Bees

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Biography:

Dr. Charles Turner:

Entomologist

(1867-1923)

Charles Turner was the first person to discover that insects can hear and that bees are attracted to flowers with the brightest colors and the sweetest smell. He also originated a way of watching and recording the habits of insects and the ways they react to each other. This behavior is called "Turner's Circling." Dr. Turner was called an entomologist because he studied insects.

When he was a young child, he watched and played with insects. He went to college to study insects. Charles Turner is called a doctor of entomology, because he studied insects in school. Charles Turner taught high school biology and was also the principal of a high school. His students felt that he was an inspiring and outstanding teacher. Dr. Turner wrote stories and poems for children as a hobby. In 1954, the Turner Middle School in St. Louis, Missouri was dedicated in honor of Dr. Charles Turner.

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Biography:

Dr. Shirley Mathis McBay:

Mathematician

(1935-   )

Shirley Mathis McBay is a famous mathematician. A mathematician is a scientist who studies math. When she was younger, she was a good student as well as a cheerleader and an actress. She studied so much that she was teased by her friends, but she listened to her grandmother and her mother who encouraged her to do her school work. She knew that it was very important to study hard. She studied hard in college for many years and received a doctorate in math. A doctorate is one of the highest degrees that you can receive in college. She also taught mathematics at Spelman College in Atlanta, Georgia.

Today, Dr. McBay works to help all children receive a good education. Getting a good education helped her to get good jobs. It also made it possible for her to help other people. Today, Dr. McBay is the director of the project "Quality Education for Minorities" in Washington, D.C. This project is making sure that all children get a good education. Dr. McBay wants other people to have the same opportunities she had because she studied hard in school. Solving mathematical problems in school as a student helps her to solve problems today. She always tells students to study hard no matter what their friends say.

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Dr. Shirley Mathis McBay

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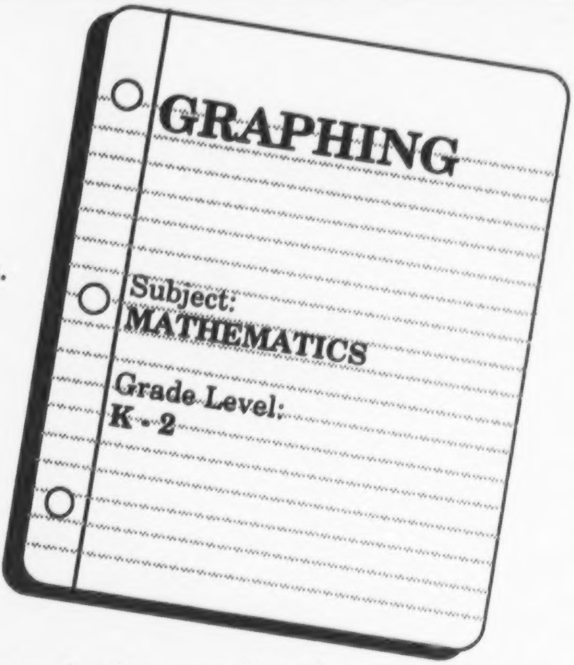


Concept Statement

Much information is given in picture graphs.

Instructional Objective

The student will:

- Construct and interpret a simple picture graph.

African American Role Models

The student will:

- Identify famous Black people born in the same month as the students.
- Name the contributions and achievements of the identified Black people.

Affective Factors

- *Perceived Utility* - The calendar helps tell time by day, month, and year.
- *Stereotyping* - Students may remember famous Black people because of common birthdays and identify with positive role models rather than negative stereotyping.
- *Attitude* - Teachers help students maintain positive attitudes toward mathematics and science by pointing out the important contributions these role models have made to our society.

Materials

Biography books of Blacks
Crayons
Glue
Pencil
Scissors

Vocabulary

Biography
Common
Graph
Months of the Year

Teaching Procedures

- Ask students to describe a calendar. Have students name the months of the year as you write them on the board. Then ask who was born in each month. Write the names of the students next to the month they were born.

- Discuss with the students a way of presenting the same information in a graph form. Tell them this is similar to a chart. Tell them that a calendar is a chart or graph that gives information. *NOTE:* The teacher should demonstrate that a graph needs a title, a horizontal reference and label, as well as a vertical reference and label.
- Draw a small grid on the board for the 12 months and have each student come to the board to shade in a region above the month of his/her birthday. Distribute the worksheet, ***Birthdays in Our Class***, (page M-68).
- Distribute the handout, ***Famous Black American Birthdays*** (pages M-69 through M-78). Ask students to identify a famous Black person born on their birthday, or one born in the same month, to become a "birthday buddy." Ask students to find out more about their "birthday buddy" by going to the library. Have them report their findings to the class.
- Show photographs of Mary McLeod Bethune, Bill Cosby, Patrick Ewing, Jesse Jackson, Dr. Martin Luther King Jr., Jesse Owens, Renee Powell, Wilma Rudolph, Phillis Wheatley, and Oprah Winfrey (pages M-79 through M-88).
- Discuss the word "common" as having the same of something. For this lesson you might discuss common birthdays, common birth months, and common contributions.

Follow-up Activities

- Develop with the students a bulletin board that will expand during the year. Each month teach about one famous Black person listed by placing a picture on the board, reading a biography, or having students present book reports. Under the picture of each person, one or more facts may be listed.
- Illustrate the life and contributions of one or more Black people in a play.
- Construct or purchase a wall calendar that focuses on Black history. Assign each student a day of the month. Every day a different fact about Black history may be read aloud to the class.
- Use career posters to illustrate the occupations of each person by month or make a random selection. Job skills should be discussed in relation to what the students want to be in the future.

Resources

Altman, Susan. *Extraordinary Black Americans from Colonial to Contemporary Times.* Chicago: Children's Press, 1989.

Ginsberg, Dale Ann. *Black History, Black Lives: A Comprehensive List of Black Biographies for Young People Arranged by Birthdate.* Merion Station, PA: Anndale Books, 1986.

Kranz, Rachel. *The Biographical Dictionary of Black Americans.* New York: Facts on File, 1990.

National Black Child Development Institute, (Annual Calendar), 1463 Rhode Island Avenue, NW, Washington, D.C. 20005.

Ploski, Harry A. and James Williams (Eds.) *The Negro Almanac: A Reference Work on the African American.* (Fifth Edition) Detroit: Gale Research, 1989.

Sample Biographies

Aaseng, Nathan. *Florence Griffith Joyner: Dazzling Olympian.* Minneapolis: Lerner Publications Company, 1989.

Bundles, A'Lelia. *Madam C. J. Walker.* New York: Chelsea House Publishers, 1990.

Busner, Gene. *The Picture Life of Whitney Houston.* New York: Franklin Watts, 1988.

Faber, Doris. *Martin Luther King, Jr.* Lakeville, CT: Grey Castle Press, 1990.

Klimet, Bud. *Ella Fitzgerald.* New York: Chelsea House Publishers, 1988.

Olsen, James. *Bill Cosby: Look Back in Laughter.* Chicago: Children's Press, 1974.

Rolfe, John. *Bo Jackson.* New York: Warner Juvenile Books, 1991.

Rubel, David. *Fannie Lou Hamer: From Sharecropping to Politics.* Morristown, NJ: Silver Burdett Press, 1990.

Samples, Pat. *Jesse Owens.* Mankato, MN: Capstone Press, 1989.

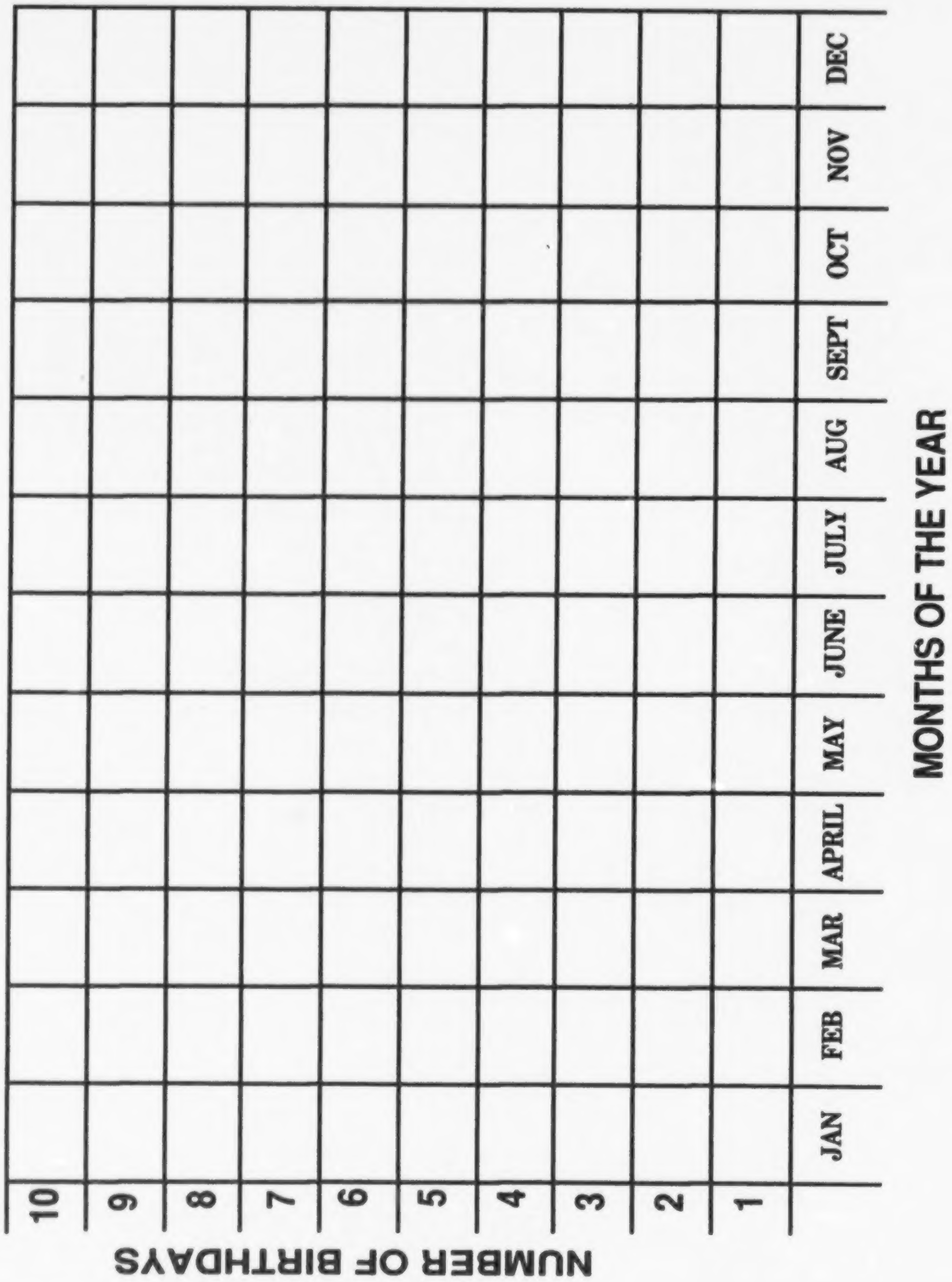
Scheader, Catherine. *Shirley Chisholm: Teacher and Congresswoman.* Hillsdale, NJ: Enslow Publishers, 1990.

Wilkinson, Brenda. *Jesse Jackson: Still Fighting For the Dream.* Morristown, NJ: Silver Burdett Press, 1990.

Name________________________________ Date________________

Worksheet:

Birthdays in Our Class



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Handout:

Famous Black American Birthdays

JANUARY

January 2, 1915
John Hope Franklin
Author, Educator, and Historian

January 3, 1956
Willy T. Ribbs
Race Car Driver

January 6, 1923
Leah Chase
Chef

January 6, 1957
Trudy S. Moore
Editor, Journalist

January 7, 1901
Zora Neale Hurston
Anthropologist, Author

January 7, 1919
Dorothy Brown
Physician

January 8, 1911
Butterfly McQueen
Actress

January 12, 1920
James Farmer
Civil Rights Leader, Professor

January 14, 1936
James W. Morrison, Jr.
Consultant, Lobbyist

January 15, 1929
Dr. Martin Luther King, Jr.
Civil Rights Leader, Minister

January 16, 1950
Debbie Allen
Choreographer, Director

January 17, 1759
Paul Cuffee
Shipbuilder

January 17, 1942
Muhammad Ali
Athlete

January 19, 1918
John H. Johnson
Publisher

January 20, 1895
Eva Jessye
Choral Director

January 26, 1893
Bessie Coleman
Pilot

January 26, 1940
Sherian Cadoria
Brigadier General

January 29, 1925
Benjamin Hooks
Civil Rights Leader

January 29, 1954
Oprah Winfrey
Talk Show Hostess

January 30, 1944
Sharon Pratt Kelly
Mayor, Washington, D.C.

January 30, 1954
Donnie Simpson
Radio Host

January 31, 1919
Jackie Robinson
Athlete

Continued on next page

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FEBRUARY

February 1, 1902
Langston Hughes
Author, Poet

February 3, 1898
Lillian Hardin Armstrong
Musician, Composer

February 4, 1913
Rosa Parks
Civil Rights Activist

February 5, 1934
Hank Aaron
Athlete

February 6, 1933
Walter Fauntroy
Congressperson

February 6, 1945
Bob Marley
Musician

February 9, 1923
Willis Payton
Lawyer

February 9, 1944
Alice Walker
Author

February 10, 1927
Leontyne Price
Opera Singer

February 14, 1760
Richard Allen
Religious Leader

February 14, 1817
Frederick Douglass
Abolitionist, Orator

February 17, 19--
Mable Hayden
President, National Association of Black Women Attorneys

February 17, 1902
Marian Anderson
Singer

February 18, 1931
Toni Morrison
Author

February 20, 1927
Sidney Poitier
Actor

February 21, 1936
Barbara Jordan
Congressperson

February 22, 1950
Julius Erving (Dr. J)
Athlete

February 23, 1868
W.E.B. Dubois
Author, Historian

February 29, 1892
Augusta Savage
Sculptor, Teacher

MARCH

March 1, 1914
Ralph Ellison
Author

March 3, 1962
Jackie Joyner-Kersee
Athlete

March 4, 1877
Garrett Morgan
Inventor

Continued on next page

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March 5, 1920
Leontine T. C. Kelly
Bishop

March 8, 1924
Addie Wyatt
AFL-CIO Executive

March 9, 1948
Jeffrey Osborne
Singer, Songwriter

March 11, 1929
Ralph David Abernathy
Civil Rights Leader, Minister

March 11, 1950
Bobby McFerrin
Entertainer

March 12, 19--
D. Barrett Campbell
Singer

March 12, 19--
Virginia Hamilton
Author

March 12, 1962
Darryl Strawberry
Athlete

March 14, 1933
Quincy Jones
Musician, Producer

March 18, 19--
Francis Welsing
Psychiatrist

March 18, 1922
Andrew Young Jr.
Civil Rights Leader, Minister

March 20, 1957
Spike Lee
Director

March 23, 1954
Chaka Khan
Singer

March 24, 1912
Dorothy Height
President, National Council of Negro Women

March 25, 1942
Aretha Franklin
Singer

March 25, 1967
Debi Thomas
Athlete

March 26, 1944
Diana Ross
Singer

March 27, 1934
James Stricklin
Television Cameraman

March 29, 1918
Pearl Bailey
Entertainer

March 31, 1882
Charles Stewart Parker
Botanist

APRIL

April 2, 1950
Joey Mills
Make-up Artist

April 3, 1961
Eddie Murphy
Actor, Comedian

April 4, 1928
Maya Angelou
Novelist, Poet

April 5, 1839
Robert Smalls
Civil War Hero

Continued on next page

April 5, 1856
Booker T. Washington
Educator

April 5, 1937
General Colin Powell
Chair, U.S. Joint Chiefs of Staff

April 7, 1915
Billie Holiday
Singer

April 8, 1938
Eleanor Holmes Norton
Congressperson

April 9, 1898
Paul Robeson
Actor, Singer

April 15, 1889
A. Philip Randolph
Civil Rights Leader

April 15, 1915
Elizabeth Catlett
Painter, Sculptor

April 15, 1928
Norma Merrick Sklarek
Architect

April 16, 1947
Kareem Abdul Jabbar
Athlete

April 19, 1916
Mary Elizabeth Carnegie
Educator, Nurse

April 20, 1951
Luther Vandross
Singer, Songwriter

April 23, 1856
Granville T. Woods
Inventor

April 25, 1918
Ella Fitzgerald
Singer

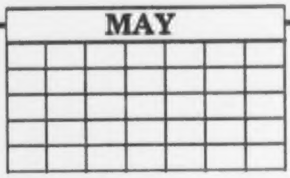
April 27, 1927
Coretta Scott King
Civil Rights Activist

April 29, 1899
Duke Ellington
Musician, Composer

April 29, 1922
Parren Mitchell
Congressperson

April 30, 1931
William Clay
Congressperson

MAY



May 2, 1844
Elijah McCoy
Inventor

May 3, 1898
Septima Clark
Educator, Humanitarian

May 4, 1946
Renee Powell
Athlete

May 12, 1926
Mervyn Dymally
Congressperson

May 13, 1914
Joe Louis
Athlete

May 13, 1950
Stevie Wonder
Musician, Composer

May 14, 1888
Archie Alexander
Engineer, Former Governor of the Virgin Islands

May 16, 1929
John Conyers Jr.
Congressperson

Continued on next page

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May 19, 1925
Malcolm X
Civil Rights Leader

May 19, 1930
Lorraine Hansberry
Author

May 20, 1945
Harold Ford
Congressperson

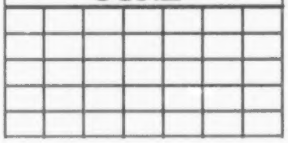
May 22, 1957
Nathaniel Thomas
Film Producer

May 25, 1943
Leslie Uggams
Entertainer

May 25, 1949
Jamaica Kincaid
Author

May 31, 1924
Patricia Roberts Harris
Lawyer, Politician

JUNE



June 3, 1904
Charles Drew
Physician

June 3, 1919
Elizabeth Duncan Koontz
Educator

June 5, 1945
John Carlos
Athlete

June 6, 1939
Marian Wright Edelman
Founder, Children's Defense Fund

June 7, 1917
Gwendolyn Brooks
Poet

June 10, 1898
Hattie McDaniel
Actress

June 11, 1930
Charles Rangel
Congressperson

June 17, 1871
James Weldon Johnson
Novelist, Poet

June 17, 1937
Robert Maynard
Editor

June 18, 1941
Claude Matthews
Television Producer

June 21, 1859
Henry O. Tanner
Artist

June 21, 1927
Carl Burton Stokes
Judge, Politician

June 22, 1909
Katherine Dunham
Choreographer, Dancer

June 23, 1936
Charles Blagrove Hobson
Television Producer

June 23, 1940
Wilma Rudolph
Athlete

June 25, 1933
James Howard Meredith
Civil Rights Leader, Lawyer

June 27, 1872
Paul Lawrence Dunbar
Novelist, Poet

June 29, 1946
Brenda McCurdy
Microbiologist

June 30, 1917
Lena Horne
Entertainer

Continued on next page

JULY

July 1, 1877
Benjamin Davis
Brigadier General

July 1, 1893
Walter Francis White
Former Executive Secretary, NAACP

July 2, 1908
Thurgood Marshall
Former Associate Justice,
U.S. Supreme Court

July 4, 1900
Louis Armstrong
Musician

July 7, 1920
William Thaddeus Coleman, Jr.
Lawyer

July 8, 1943
Faye Wattleton
President, Planned Parenthood
Association

July 10, 1875
Mary McLeod Bethune
Educator

July 10, 1943
Arthur Ashe
Athlete

July 12, 1937
Bill Cosby
Actor, Comedian

July 17, 1935
Diahann Carroll
Actress

July 19, 1904
William Hastie
Federal Judge

July 21, 1912
Mollie Moon
Pharmacist, Social Worker

July 23, 1947
Spencer Christian
Weather Forecaster

July 24, 1914
Kenneth Bancroft Clark
Educator, Psychologist

July 25, 1954
Walter Payton
Athlete

July 29, 1824
Alexandra Dumas
Author

July 29, 1937
Evelyn Moore
Executive Director, National
Black Child Development Institute

AUGUST

August 1, 1895
Benjamin Mays
Educator

August 2, 1924
James Baldwin
Author

August 5, 1946
Shirley Jackson
Physicist

August 5, 1962
Patrick Ewing
Athlete

August 7, 1904
Ralph Bunche
Diplomat

Continued on next page

August 8, 1921
Doris Saunders
Journalist, Publisher

August 9, 1963
Whitney Houston
Singer

August 10, 1859
James Farley
Photographer

August 11, 1921
Alex Haley
Author

August 11, 1925
Carl Thomas Rowan
Columnist

August 12, 1944
Renee Poussant
News Commentator

August 17, 1887
Marcus Garvey
Black Nationalist

August 19, 1935
Floretta McKenzie
Former Superintendent,
DC Public Schools

August 20, 1941
William Gray III
Congressperson

August 21, 1904
William "Count" Basie
Musician

August 22, 1917
John Lee Hooker
Musician

August 25, 1927
Althea Gibson
Athlete

August 26, 1960
Branford Marsalis
Musician

August 29, 1920
Charlie "Bird" Parker
Musician

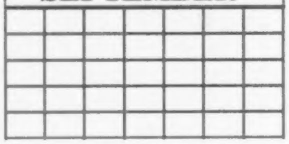
August 29, 1958
Michael Jackson
Entertainer

August 30, 1931
Carrie Saxon Perry
Mayor, Hartford, Connecticut

August 31, 1907
Augustus Hawkins
Congressperson

August 31, 1936
Marva Collins
Educator

SEPTEMBER



September 2, 1941
John Thompson, Jr.
Athletic Coach

September 4, 1848
Lewis H. Latimer
Inventor, Engineer

September 7, 1917
Jacob Lawrence
Artist

September 9, 1908
Richard Wright
Novelist

September 12, 1913
Jesse Owens
Athlete

September 13, 1946
Alton Lavan
Athletic Coach

Continued on next page

September 14, 1921
Constance Baker Motley
Federal Judge

September 16, 1934
Elgin Gay Baylor
Sports Promoter, Team Manager

September 16, 1948
Vernon Odom, Jr.
Broadcast Journalist

September 18, 1951
Benjamin Carson
Neurosurgeon

September 23, 1883
Mary Church Terrell
Educator

September 23, 1930
Ray Charles
Musician

September 24, 1931
Cardiss Collins
Congressperson

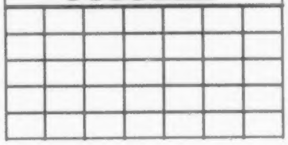
September 26, 1936
Winnie Mandela
African Liberation Activist

September 27, 1822
Hiram R. Revels
First Black U.S. Senator

September 28, 1785
David Walker
Abolitionish

September 29, 1931
Lenora Moragne
Nutritionist, Scientist

OCTOBER



October 2, 1800
Nat Turner
Abolitionist

October 3, 1944
John Lawrence
Agronomist

October 4, 1944
Patti LaBelle
Singer

October 5, 1932
Yvonne Braithwaite Burke
Lawyer, Politician

October 6, 1917
Fannie Lou Hamer
Civil Rights Leader

October 7, 1931
Desmond Tutu
Bishop, Pulitzer Prize Winner

October 8, 1941
Jesse Jackson
Civil Rights Leader, Minister

October 9, 1844
Eugene Jacques Bullard
Pilot

October 12, 1920
Alice Childress
Actress, Playwright

October 12, 1932
Dick Gregory
Author, Humanitarian

October 13, 1926
Jesse LeRoy Brown
Pilot

October 13, 1949
Leona Mitchell
Opera Singer

October 14, 1948
Dmitri Wright
Artist

October 16, 1922
Leon Howard Sullivan
Minister

October 17, 1953
Mae C. Jemison
Astronaut, Physician

Continued on next page

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October 18, 1926
Chuck Barry
Musician

October 18, 1948
Ntozake Shange
Poet, Playwright

October 21, 1950
Ronald McNair
Astronaut, Physicist

October 23, 1940
Pelé Edson
Athlete

October 26, 1911
Mahalia Jackson
Gospel Singer

October 26, 1919
Edward William Brooke
Politician

October 27, 1923
Ruby Dee
Actress

October 31, 1900
Ethel Waters
Entertainer

NOVEMBER

November 1, 1917
Margaret Taylor Burrough
Co-Founder, DuSable Museum of African-American History

November 3, 1905
Lois Jones
Artist, Educator

November 6, 1746
Absolom Jones
Black American Pioneer

November 7, 1950
Alexa Canady
Neurosurgeon

November 9, 1731
Benjamin Banneker
Inventor, Mathematician

November 13, 1949
Whoopi Goldberg
Entertainer

November 16, 1873
W.C. Handy
Musician

November 22, 1942
Guion Bluford
Astronaut

November 24, 1868
Scott Joplin
Musician

November 24, 1935
Ronald Dellums
Congressperson

November 26, 1939
Tina Turner
Actress, Singer

November 27, 1944
Mickey Leland
Congressperson

November 28, 1929
Berry Gordy, Jr.
President, Motown Records

November 30, 1919
Jane C. Wright
Medical Researcher, Surgeon

November 30, 1924
Shirley Chisholm
Congressperson

November 30, 1932
Barbara Proctor
Business Executive

Continued on next page

November 30, 1962
Bo Jackson
Athlete

November 31, 1948
Donna Summer
Singer

DECEMBER

December 1, 1940
Richard Pryor
Entertainer

December 3, 1935
Howard Kent Walker
Ambassador

December 8, 1925
Sammy Davis Jr.
Entertainer

December 18, 1900
Hennetta Bradberry
Inventor

December 18, 1917
Ossie Davis
Actor

December 19, 1875
Carter G. Woodson
Historian

December 19, 1933
Cicely Tyson
Actress

December 23, 1941
Edith Irby Jones
Dietician

December 25, 1904
Flemmie Pansy Kittrell
Nutritional Chemist

December 29, 1917
Tom Bradley
Mayor, Los Angeles

December 31, 1930
Odetta
Singer

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Mary McLeod Bethune

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Bill Cosby

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Patrick Ewing

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BEST COPY AVAILABLE

Jesse Jackson

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Dr. Martin Luther King Jr.

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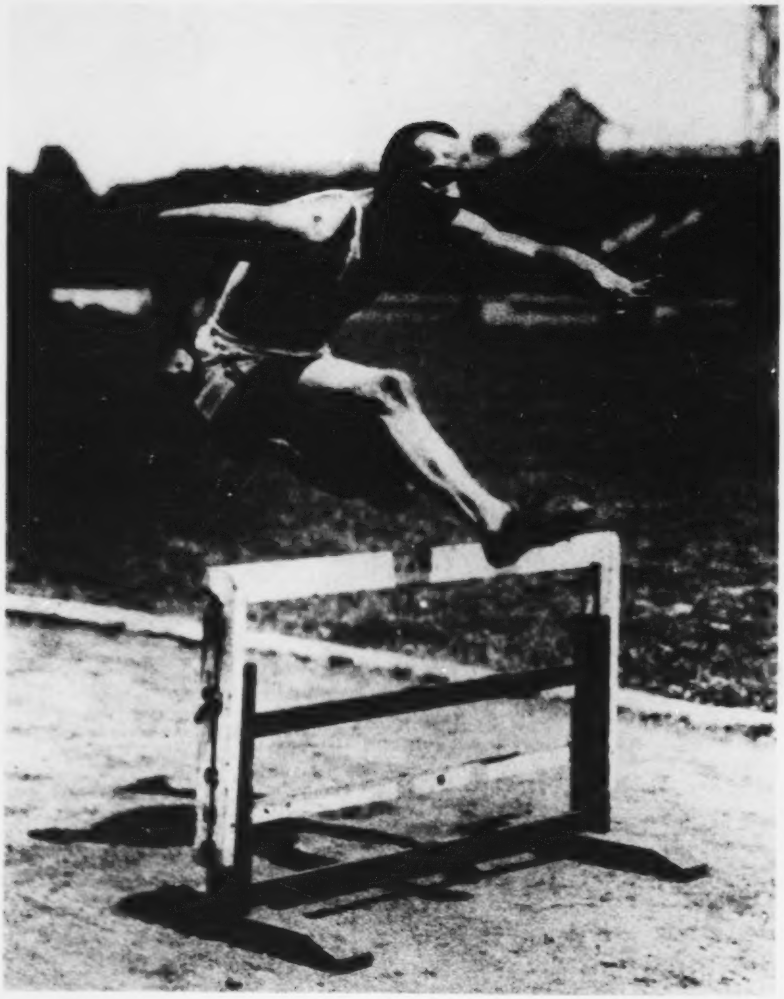
Jesse Owens



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M-84

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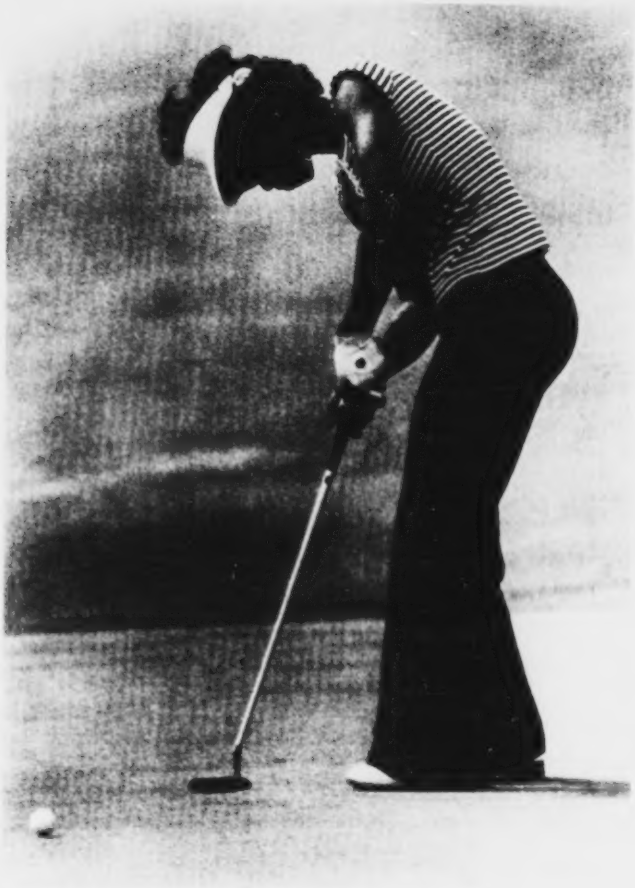
Renee Powell



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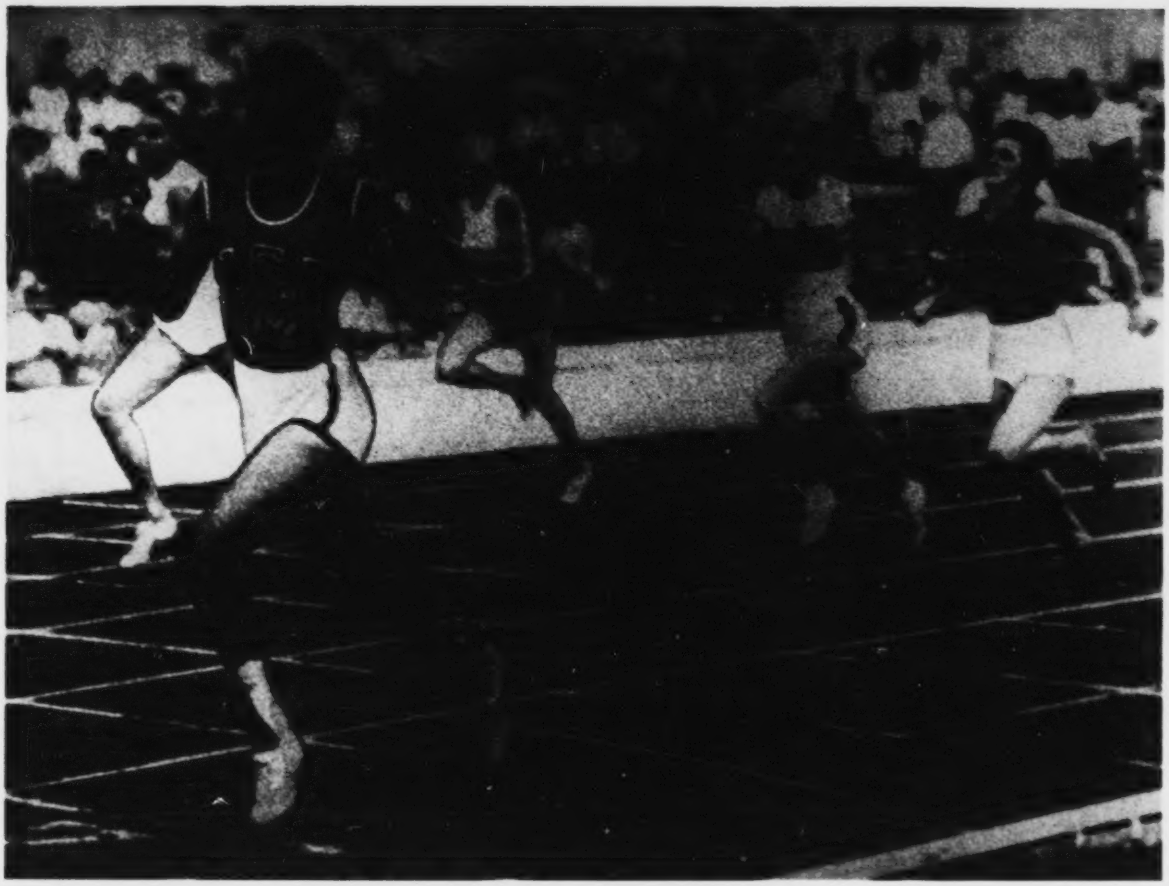
Wilma Rudolph



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M-86

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Phillis Wheatley

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Oprah Winfrey

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M-88

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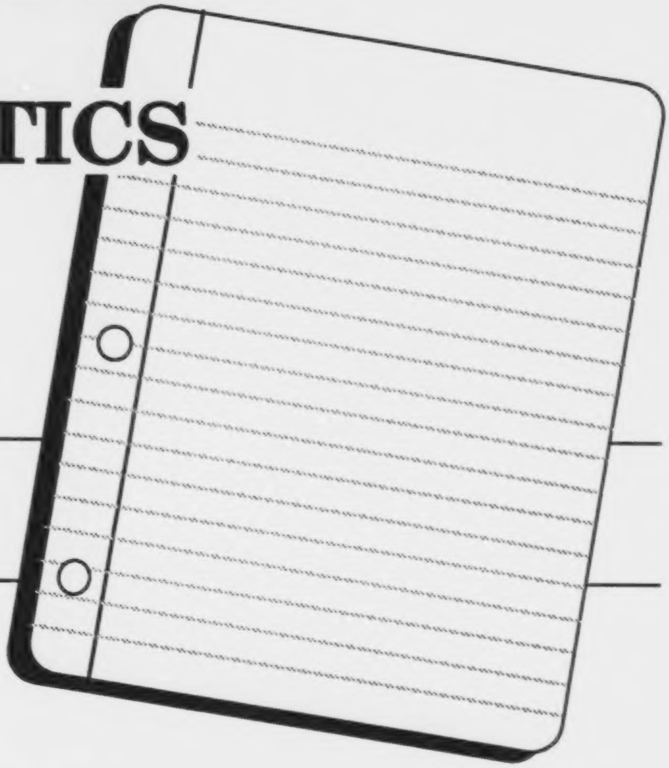
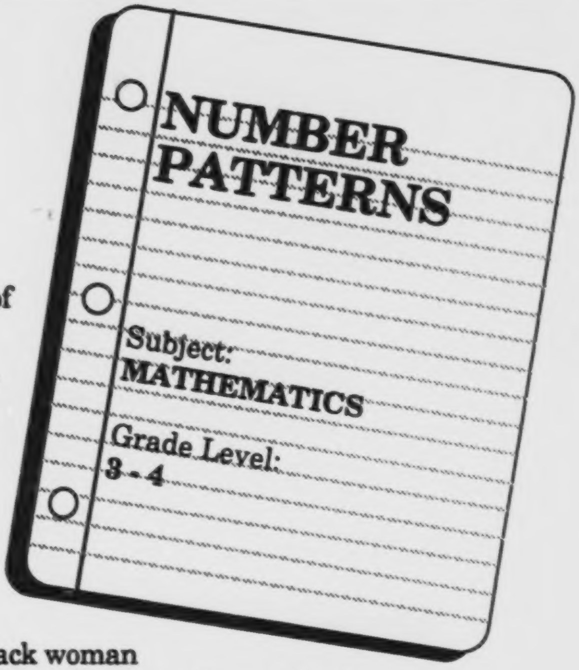
INTRODUCING AFRICAN AMERICAN ROLE MODELS INTO MATHEMATICS LESSON PLANS



Grades 3 - 4



NUMBER PATTERNS

Subject:
MATHEMATICS

Grade Level:
3 - 4

Concept Statement

Multiples of numbers form patterns on the One Hundred Chart.

Instructional Objectives

The student will:

- Identify patterns involved in the operation of multiplication.
- Identify the constellations, The Big Dipper and the Little Dipper, and find out how the enslaved Black people used them as a guide in their escape to freedom.

African American Role Model

The student will:

- Identify Harriet Tubman as an enslaved Black woman who found secret paths to freedom and risked her life many times to lead an estimated three hundred slaves to freedom through her "Underground Railroad."

Affective Factors

- *Perceived Utility* - The study of mathematics and science is applicable to everyday life. Patterns and designs can help us remember locations by acting as guides for solving problems.
- *Persistence* - Students will see that to achieve goals and objectives in life requires the ability to persist, especially in the face of conflict. The enslaved Black people who escaped to freedom and those who aided them represent models of persistence, courage, and determination.

Materials

Books on constellations, stars, etc.
Crayons or markers

Vocabulary

Big Dipper
Constellation
Design
Factor
Gourd
Little Dipper
Multiple
Pattern
Polaris
Product
Underground Railroad

Teaching Procedures

- Distribute worksheet, ***One Hundred Chart*** (page M-92), to each student and have them number from 1 to 100 beginning on the top row left to right.
- Divide the students into four groups. Have one group color blue all the multiples of 2 (numbers you say as you count by 2), another group color red all multiples of 3, another group color green all multiples of 5, and another group color orange all multiples of 10.
- Have the groups show and describe each pattern formed by each set of multiples. The 3's are in a diagonal; the 5's are down the middle; the 10's are down the right side and the 2's are every other number. Ask, "Where are the multiples of 4, 6, 8, and 9?"
- Ask the students if they know of any special design or pattern which helps us. Students may discuss the designs in our clothing, certain ways we color code objects in the classroom, and designs in architecture.
- Tell the students that just as we use patterns to help us learn, long ago people used patterns in the sky to help them find directions. The enslaved Black people used a pattern or a design of the stars in the sky to help them escape to freedom. Read with the students the handout, ***The Stars in the Sky: The Guides to Freedom*** (page M-93).
- Discuss the meaning of a constellation and why the Big and Little Dippers were so important to the enslaved Black people.
- Distribute and discuss biography, ***Harriet Tubman: Abolitionist*** (page M-94).

Follow-up Activities

- Read the book, *The Drinking Gourd*, by F.N. Monjo, with the students, and/or discuss the song in handout, ***Follow the Drinkin' Gourd*** (pages M-96 through M-97). Introduce the words:

  Abolitionist - A person who favors eliminating slavery.

  Underground Railroad -A secret system of cooperation among abolitionists which helped the enslaved Black people escape to the slave-free Northern States and Canada. The word "railroad" refers to the routes that the enslaved Blacks followed. It was not an actual railroad. The word "underground" refers to secrecy.

- Assign students (independently or in groups) to research and make reports on:
  - Abolitionist Movement
  - Black American Spiritual Music
  - The Underground Railroad
- Assign students to research and report on other constellations.

Resources

Bentley, Judith. *Harriet Tubman.* New York: Franklin Watts, 1990.

Green, Richard L. (Ed.) Frederick McKissack, Senior Editor. *Historic Black Abolitionists.* Chicago: Empak Publishing Company, 1990.

Kranz, Rachel. *The Biographical Dictionary of Black Americans.* New York: Facts on File, 1990.

Monjo, F.N. *The Drinking Gourd.* New York: Harper and Row Publishers, 1970.

Petry, Ann Lane. *Harriet Tubman: A Conductor on the Underground Railroad.* Marshall Cavendish (Ed.) Lakeville, CT: Grey Castle Press, 1990.

Rey, H.A. *Find the Constellation.* Boston: Houghton Mifflin, 1976.

Name ______________________________ Date ________________

Worksheet:

One Hundred Chart

1	2	3							
									50

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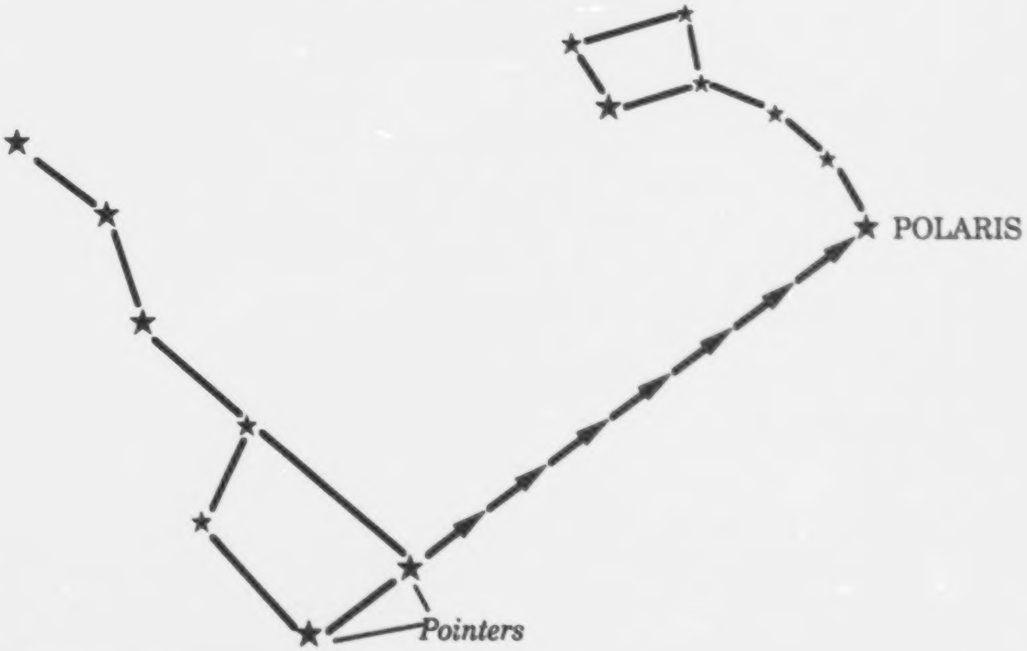
Handout:

The Stars in the Sky: The Guides to Freedom

There is a star called Polaris or the Pole Star that helps us with directions. It is also called the North Star because it is always located in the North and never moves. When you look at Polaris you are facing North; to your right is East, to your left is West, and behind you is South. Polaris is easy to find in the sky at night. Look for the Big Dipper. Draw a line from the two stars in the bowl to the last star in the handle of the Little Dipper. This line will point to Polaris.

In the early 1800's, enslaved African Americans used the Big and Little Dippers as guides to the North during their attempt to escape to freedom. They called the constellation "The Drinking Gourd." The escaping slaves sang a song, "Follow the Drinkin' Gourd," which provided encouragement to escape and motivation to continue as they traveled North to the slave-free states and to Canada.

Big and Little Dippers



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Biography:

Harriet Tubman:

Abolitionist

(1820 – 1913)

Harriet Tubman was born enslaved. For the first 29 years of her life, she had no idea how it felt to be free.

When she was 29 years old, Harriet escaped from slavery. She went to the northern states, where people did not own slaves. Harriet wanted to tell these people the horrible truths about the slavery in the south, especially about how badly the slaves were treated.

Slaves were not allowed to go to school so Harriet could not read or write. But this did not stop Harriet. She traveled throughout the northern states, speaking about what her life was like as a slave.

Telling people about slavery was not enough for Harriet; she wanted to actually do something about ending slavery. She organized a system of escape called the "Underground Railroad." This was not a railroad for trains, but for people. Harriet would sneak back into the south, where she was at risk of being recaptured, and lead other slaves to the north. She did this 19 times, freeing over 300 slaves.

Harriet was a great example of courage, bravery, and determination for all those people who agreed that the practice of slavery needed to be stopped. For those who didn't agree, Harriet was a threat. They offered a $40,000 reward to anyone who could recapture her and stop her from freeing so many slaves.

Harriet was never caught. In 1866, Sarah Bradford wrote a book about her, called *Harriet Tubman, The Moses of Her People*. She truly was a "Moses," leading more slaves to freedom than any other single person.

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Harriet Tubman

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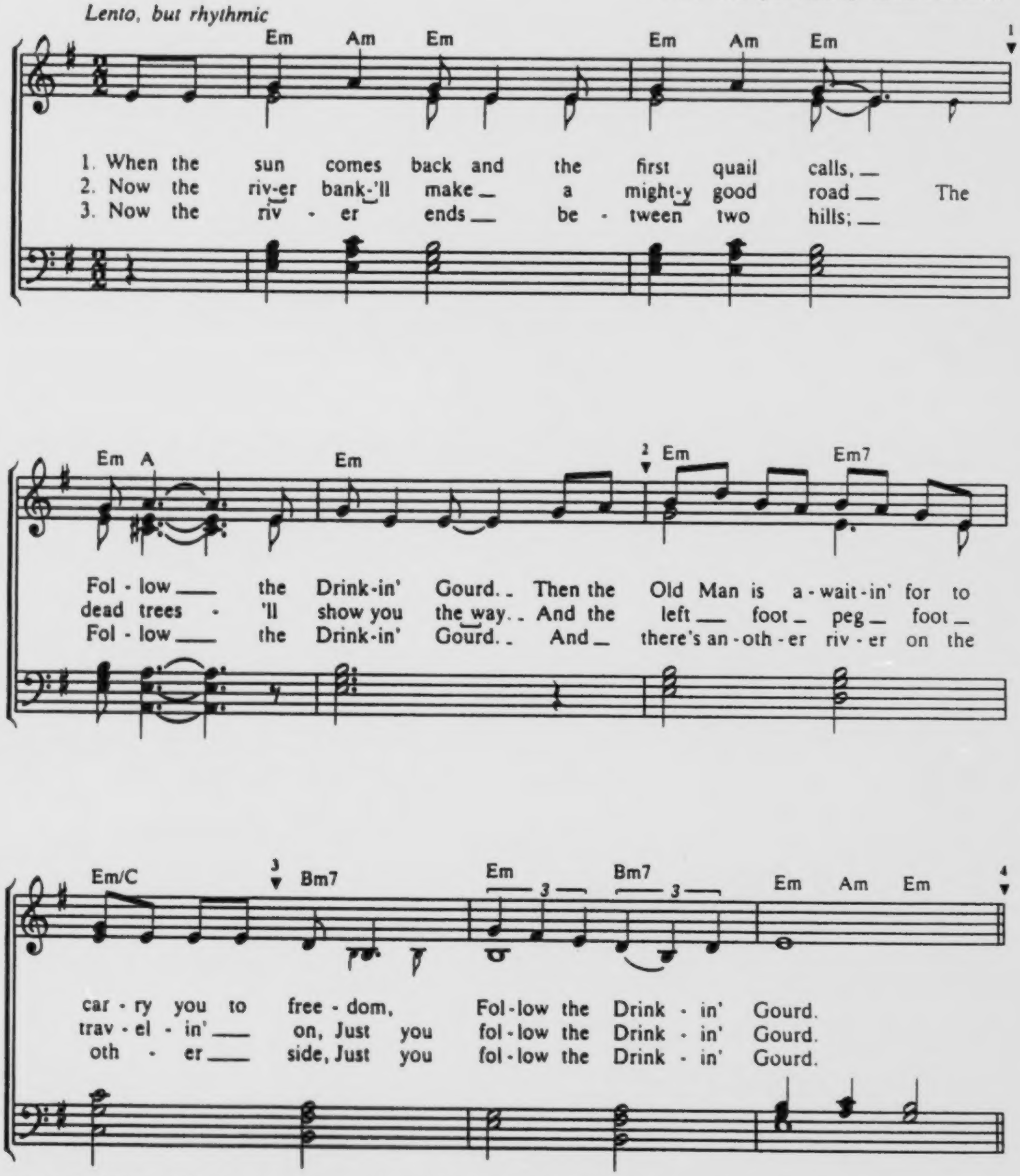
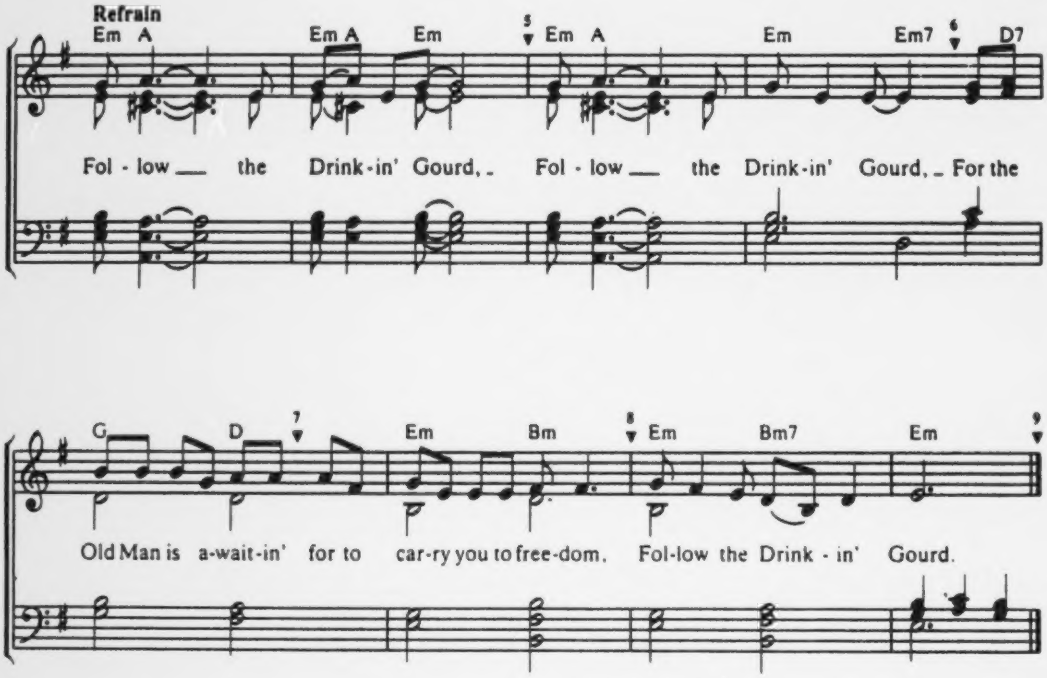
Handout:
Follow the Drinkin' Gourd

Follow the Drinkin' Gourd

African American Spiritual
Adapted by Paul Cambell
Piano accompaniment by Barbara Gastaldo


Lento, but rhythmic
Em Am Em Em Am Em
1. When the sun comes back and the first quail calls, —
2. Now the riv-er bank-'ll make — a might-y good road — The
3. Now the riv - er ends — be - tween two hills; —
Em A Em 2 Em Em7
Fol - low — the Drink-in' Gourd. Then the Old Man is a - wait - in' for to
dead trees - 'll show you the way. And the left — foot — peg — foot —
Fol - low — the Drink-in' Gourd. And — there's an - oth - er riv - er on the
Em/C 3 Bm7 Em Bm7 Em Am Em 4
car - ry you to free - dom, Fol-low the Drink - in' Gourd.
trav - el - in' — on, Just you fol-low the Drink - in' Gourd.
oth - er — side, Just you fol-low the Drink - in' Gourd.

Follow the Drinkin' Gourd, Words and music arranged by Paul Campbell. TRO—©Copyright 1951 and renewed 1979 Folkways Music Publishers, Inc. New York, N.Y. Used by permission.


Refrain
Em A
Em A
Em
5
Em A
Em
Em7
6
D7
Fol - low the Drink-in' Gourd, Fol - low the Drink-in' Gourd, For the
G
D
7
Em
Bm
8
Em
Bm7
Em
9
Old Man is a-wait-in' for to car-ry you to free-dom. Fol-low the Drink - in' Gourd.

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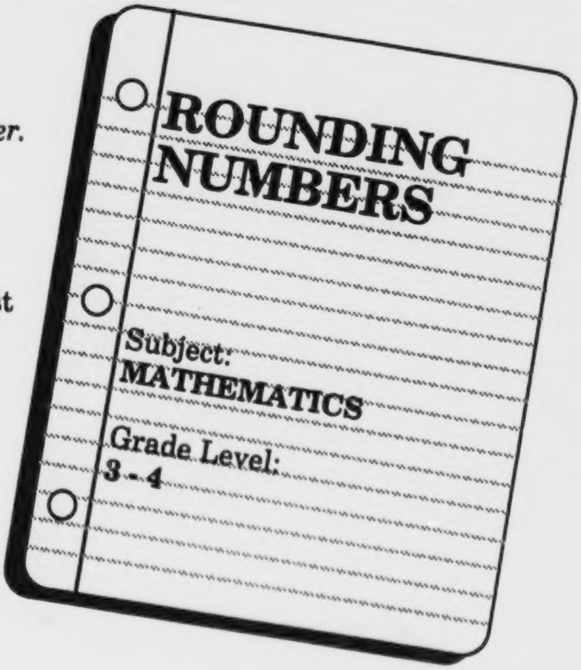

ROUNDING NUMBERS

Subject:
MATHEMATICS

Grade Level:
3 - 4

Concept Statement

Rounding a number makes computing and estimating both amounts and time much easier.

Instructional Objective

The student will:

- Learn how to round money to the nearest dollar.

African American Role Models

The student will:

- Identify Jessie H. Mitchell as a Banker; Milton L. Scott as a Certified Public Accountant; and Maggie L. Walker as an Entrepreneur and Philanthropist.

Affective Factors

- *Attitude* - Students will learn that by having a positive attitude, many great things can be accomplished.
- *Persistence* - Students will see that to be successful, determination and persistence are required. The African American role models are all examples of determination and persistence.

Materials

Calculators (optional)
Paper/index cards
Pencils
Play money
Scissors
Tape

Vocabulary

Balance
Balance forward
Bank account
Cents
Decade
Decrease
Deduct
Dollars
Estimate
Increase
Round to the nearest dollar
Transaction

Teaching Procedures

- Distribute play money and have students represent given amounts. In pairs, have one student count out money values that are less than $10.00, and have the partner write that value in symbols.

- Use handout, ***Dollar Value Cards***, (pages M-102 through M-105) as a model for this exercise. Tape Dollar Value Cards to the chalkboard, leaving enough space between each card for students to place their money value cards between them. Distribute worksheet, ***Student Money Value Cards*** (page M-106). Have students create their own money values using amounts from $0.01 to $9.99 and then write these values on the cards. They should then place their money value cards between the two appropriate dollar value cards on the board. As this is done, the students should tell a short story in the form of: "I bought (or sold) a set of stickers for $2.49. The price is between $2.00 and $3.00." The card should be placed between the $2.00 and $3.00 cards on the board.
- Distribute the worksheet, ***About How Much?*** (pages M-107 through M-108). The students will model 10 transactions of their choice based on the amounts created for the previous activity. Discuss with them that buying an item means deducting (subtracting) the amount from their bank account and that selling an item means increasing (adding) the amount to their bank account. Students should mentally compute the "balance rounded to the nearest dollar" to get a quick estimate of their balance. Calculators may be used to compute the actual balance after all transactions are complete.
- Have the students read the biographies, ***Jessie H. Mitchell: Banker*** (page M-109), ***Milton L. Scott: Certified Public Accountant*** (pages M-110 through M-111), and ***Maggie L. Walker: Entrepreneur and Philanthropist*** (pages M-113 through M-114). Discuss with students why banking and counting skills are important. Ask students what jobs need these skills.

Follow-up Activities

- Develop a grocery list, then review grocery advertisements from the newspapers for at least two stores; estimate the cost of the groceries if purchased at each store.
- Have students design their own bedroom and then review catalogs and advertising supplements to estimate the cost of their bedrooms; determine how much money they will need to borrow from the "bank" to purchase the items and pay a finance charge of $17 for every $100 "borrowed"; about how much must be paid to the "bank" each month if the total amount "borrowed" must be repaid in 24 months?
- Discuss the completion of a 1040 EZ tax form using amounts rounded to the nearest dollar.

Resources

Byers, Patricia et. al. *The Kids Money Book*. Cockeysville, MD: Liberty Publishing Company, 1983.

Fitzgibbon, Dan. *All About Your Money*. New York: Atheneum Publishers, 1984.

Jackson, George F. *Black Women Makers of History: A Portrait*. Oakland, CA: GRT Book Printing, 1975.

"Jesse H. Mitchell: A Banker for the Black Community When There Was No One Else." *The Washingtonian*. Washington, D.C.: Washington Magazine, Inc., June 1990, 85.

Low, W.A., and Virgil A. Clift (Eds.) *Encyclopedia of Black America*. New York: DaCabo Press, 1984. (Paperback Reprint)

Morgan, Tom. *Money, Money, Money*. New York: G.P. Putnam's Sons, 1978.

A Salute to Historic Black Women. Chicago: Empak Enterprises, 1984.

Handout:

Dollar Value Cards

$ 0.00

$ 1.00

$ 2.00

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$ 3.00

$ 4.00

$ 5.00

Continued on next page

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$ 6.00

$ 7.00

$ 8.00

Continued on next page

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$ 9.00

$ 10.00

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Name ________________________ Date ______________

Worksheet:

Student Money Value Cards

On each card write a money value between $ 0.01 and $ 9.99. Cut out each card.

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Name ____________________ Date ____________

Worksheet:
About How Much?

Account Number: 123-45-678 Actual Balance Forward: $ 7.78

Transaction	***Transaction Value Rounded to the Nearest Dollar***	+	−	***Balance Rounded to the Nearest Dollar***
				$8.00
Bought item for $2.29	$2.00		✓	6.00
Sold item for $3.50	4.00	✓		10.00
1. ______	______			______
2. ______	______			______
3. ______	______			______
4. ______	______			______
5. ______	______			______
6. ______	______			______
7. ______	______			______
8. ______	______			______
9. ______	______			______
10. ______	______			______

The balance rounded to the nearest dollar after transaction #10 is: $ ________

The actual balance after transaction #10 is: $ ________

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Did you expect the actual balance and the balance rounded to the nearest dollar to be the same or different? What are your reasons for expecting this?

If the two balances are the same, explain how this could happen. If the two balances are different, tell why one is greater than the other.

Do you think your balance rounded to the nearest dollar is a reasonable result? Why or why not?

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Biography:

Jesse H. Mitchell:

Banker

(1881-1954)

Jesse Mitchell was the founder and first president of the Industrial Bank of Washington, located in Washington, D.C. This bank is one of the largest African American owned banks in the nation, and it was founded for the purpose of helping African American people and businesses in the Washington D.C. area.

Born in the small town of Navasota, Texas, Jesse had very big dreams. He graduated with honors from Prairie View A & M University, and went on to get his law degree from Howard University in Washington, D.C. Jesse graduated from law school at age 28, and organized his first company, the Columbia Realty and Investment Company.

This company was successful, but Jesse wanted to do more. He saw the need for a bank in Washington, D.C. that would specifically help African Americans. So he joined a group of African American bankers and organized the Industrial Savings Bank. Because of the financial problems created by the Great Depression, the bank also experienced financial problems and eventually closed. But Jesse did not give up. He gathered his friends and sold enough stock to open the Industrial Bank of Washington in 1934. He became its first president and remained so for twenty years.

After Jesse's death in 1954, his son B. Doyle Mitchell, Sr. took over as president of the bank. Under his leadership the Industrial Bank of Washington has continued to be a very successful and prosperous bank. Today the bank has assets totaling over $130 million dollars and seven locations in the District of Columbia.

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Biography:

Milton L. Scott:

Certified Public Accountant

(1956-   )

Milton L. Scott is the first African American to become a partner in the U.S. audit and business advisory practice of the Arthur Andersen & Co. accounting firm.

Growing up in St. Francisville, Louisiana, Milton never considered becoming an accountant; he never saw any African Americans who were. But when he was in junior high school, he met a local politician, now a U.S. senator, who encouraged him to study business in school.

Throughout high school, Milton spent much of his extra time playing sports, rather than studying. Because of this, he missed out on a lot of opportunities, and had to work much harder in college. But he finally got serious about his education, and studying business, he graduated from Southern University early and with honors. He then went to work for one of the largest accounting firms in the world.

Milton's inspiration came from his mother and father, who taught him the importance of values and a good work ethic. Neither of his parents was educated, but they were determined that their children would be.

His father worked very hard as both a laborer at a paper company and a farmer. Whenever Milton felt like quitting or felt that things were just too difficult, he always looked back at how hard his father worked. When he did this, whatever problem he was facing seemed to grow smaller, as he compared it to all the struggles his father had endured.

Because Milton believes in helping young people, he is one of the Board of Directors for Inroads, Houston, Inc., and Young Audiences of Houston. Inroads is an organization that prepares minority students for careers in corporate America. Young Audiences' mission is the education of children

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through the arts, and making the arts an integral part of the school curriculum. Milton encourages young people not to worry about peer pressure and to understand who they are and to stay focused on their goals and dreams.

In 1991, Milton saw one of his dreams come true, when he received the National Achievement Award in Public Accounting from the National Association of Black Accountants, Inc.

Milton L. Scott

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Biography:

Maggie L. Walker:

Entrepreneur and Philanthropist

(1867-1934)

Maggie L. Walker was the first female bank president in the United States. Even though she was a successful businesswoman, she always remembered to help those who did not have as much as she did.

Born into poverty and slavery in 1867, Maggie worked very hard to be successful. She was a talented student and graduated from high school at the top of her class at age sixteen.

For her first job, Maggie was a teacher. She then became a secretary for the Independent Order of St. Luke Society. This Society did many good things, such as providing insurance and caring for the sick and elderly. After working there for only ten years, Maggie became the grand secretary-treasurer.

This was a hard job for Maggie, as she did not know much about handling money for such a big business. But she learned quickly, and managed to buy a better office for the Society, as well as triple its membership.

Maggie took the time to help the members save and invest their money. She had learned about saving money from Booker T. Washington, who encouraged African American people to spend their money wisely and support each other, especially in business.

After several years at the Society, Maggie founded the St. Luke Penny Savings Bank and Trust Company. She served as the president and chairman of the board. She also founded an insurance company and the *St. Luke Herald Newspaper.*

Although she was very busy with her work, Maggie still took the time to help others. She established the St. Luke Educational Fund to help

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African American children get an education, and she created a home for delinquent African American girls in the city.

In 1934, the month of October was declared "Maggie L. Walker Month" and one thousand statuettes of her were placed in African American homes, schools, and businesses across the United States. She will always be remembered for her civic, philanthropic, and economic contributions to the city of Richmond, Virginia.

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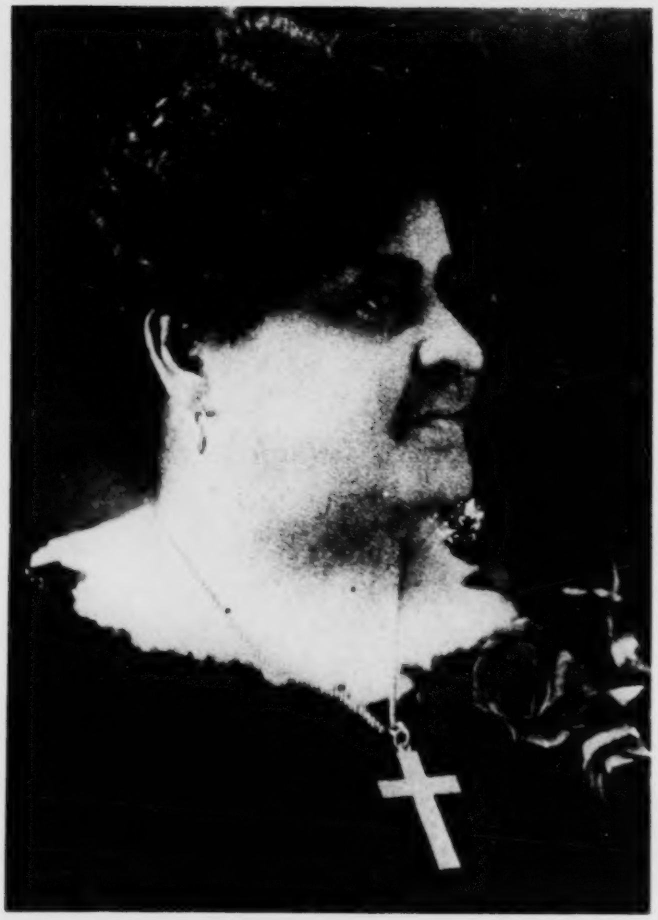
Maggie L. Walker



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LINES AND SEGMENTS

Subject:
MATHEMATICS

Grade Level:
3 - 4

Concept Statement

- *Streets and avenues are made of line segments.*
- *Buildings are made of line segments.*

Instructional Objective

The student will:

- Identify models of vertical, horizontal, and oblique line segments.

African American Role Models

The student will:

- Identify Garrett Morgan as a scientist who invented the traffic signal as one of his many inventions.
- Identify Norma Merrick Sklarek as an architect.

Affective Factors

- *Perceived Utility* - The study of mathematics and science is applicable to everyday life. The traffic light helps regulate intersections. Buildings provide shelter and work environments for people and serve as storage areas.
- *Persistence* - Students will see that achieving goals or objectives in life requires the ability to persist, whether they are facing prejudice, making discoveries, or creating inventions.

Materials

Blueprints or floor plan of a building
Crayons
Manila paper
Neighborhood or city map

Vocabulary

Blueprint
Horizontal
Intersection
Oblique
Right-of-way
Vertical

Teaching Procedures

- Show a map or a picture of your community which shows special buildings, locations, streets, and avenues. Find north. Find your school if you are using your community map. Show the floor plan of your school, major community building, or historic building.
- Help students identify streets and avenues, as well as north, south, east, and west directionals. If using a map of Washington, D.C., note that the avenues run in oblique

lines (diagonally) from the Capitol, while streets run in vertical (north, south) and horizontal (east, west) lines from the Capitol. Draw models of these lines on the chalkboard. Have the students draw the same on manila paper.

- Name the streets on the map that intersect (a point where the streets touch or cross and that point belongs to both streets). Discuss what might happen if cars and pedestrians tried to cross at the same time. Discuss how traffic is controlled at intersections.
- Read with the students the biography, ***Garrett A. Morgan: Inventor*** (page M-120). Discuss his inventions, particularly the traffic light. Discuss what a person needs to know and do to be an inventor.
- Read with the students the biography, ***Norma Merrick Sklarek: Architect*** (page M-121). Discuss what an architect does. Ask students what skills are needed to become an architect. Discuss the obstacles Sklarek overcame and her many achievements.
- Have the students name the intersections near the school that are controlled by traffic signals. Ask the students why they think a signal was placed there. Ask who has the right-of-way when the north, south (vertical) street has a red light. (The east, west has the right-of-way, that is, the horizontal street).
- Have students draw a home-to-school map with streets at different line positions and traffic lights at necessary intersections.
- Have the students draw a basic floor plan of their house. Ask the students why it is important to draw the designs of the building before starting construction. Discuss what might happen if they did not decide ahead of time the purpose of the building and the number of rooms and floors needed.

Follow-up Activities

- Take the class for a walk in the community to identify traffic lights and name the streets as models of specific lines or segments.
- Take the class for a walk to a construction site to identify the line segments that are joined together to create the frame of a building.
- Discuss how vertical and horizontal line segments are used on a football field.

Resources

D'Alelio, Jane. *I Know That Building!: Discovering Architecture with Activities and Games*. Washington, DC: Preservation Press, 1989.

Hayden, Robert. *Eight Black American Inventors*. Reading, MA: Addison-Wesley, 1972.

Ives, Patricia Carter. *Creativity and Invention: The Genius of Afro-Americans and Women in the United States and Their Patents*. Arlington, VA: Research Unlimited, 1987.

Lanker, Brian. *I Dream a World: Portraits of Black Women Who Changed America*. New York: Stewart, Tabori & Chang, 1989.

Van Zandt, Eleanor. *Architecture.* Austin, TX: Steck-Vaughn, 1990.

Weil, Lisl. *The Houses We Build.* New York: Antheneum, 1985.

Wilson, Forrest. *What It Feels Like to Be a Building.* Washington, D.C.: Preservation Press, National Trust for Historic Preservation, 1988.

Biography:

Garrett A. Morgan:

Inventor

(1875-1963)

Garrett A. Morgan was a brilliant scientist who invented both the traffic signal and the gas mask. Mr. Morgan was born into a poor family in rural Kentucky. He had eight brothers and sisters. While still a teenager, he became a sewing machine repairman. In 1907, he developed a lubricant for sewing needles. Later, he accidently discovered that it also smoothed and straightened hair. He then opened the Garrett A. Morgan Hair Refining Company which still exists today. Even though he had to work many hard jobs, he still found time to work on his inventions, like the traffic signal. Before he invented the traffic signal, there were many more accidents and traffic jams, but now the roads are much safer. He eventually sold the rights to the traffic signal to the General Electric Company. He also invented the gas mask that firemen wear when they go into a smokey building and that our soldiers wore in the Persian Gulf War. The gas mask allows people to breathe clean air so that they can save other people's lives. Although he invented the gas mask in 1914, it wasn't used until two years later when an explosion occurred at a local factory. Mr. Morgan and his brother put on their masks and rescued twenty-four men trapped in a smokey tunnel. For his bravery, Mr. Morgan was made a hero and given a gold medal. Garrett Morgan will always be remembered for his inventions that both improved the quality of life and saved many lives.

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Biography:

Norma Merrick Sklarek:

Architect

(1928 -   )

Norma Merrick Sklarek had wanted to be an architect for as long as she can remember. Unfortunately, at that time, there were few women architects and Sklarek had no role models. She worked very hard in school to achieve her dream. She graduated from the Columbia University School of Architecture and became the first Black woman to become a licensed architect in the state of New York. She also received a license in California. Norma was a professor at the University of California in Los Angeles where she taught architecture courses two days a week. Today, Norma is an architect at the largest, totally female-owned architectural company in the United States. As an architect, she is widely respected and is often recognized for her contributions to architecture. She is famous for designing the San Bernadino City Hall in San Bernadino, California, the United States Embassy in Tokyo, and Terminal One at the Los Angeles International Airport. Norma Merrick Sklarek is proud to be a role model for people who want to shape the world through architecture.

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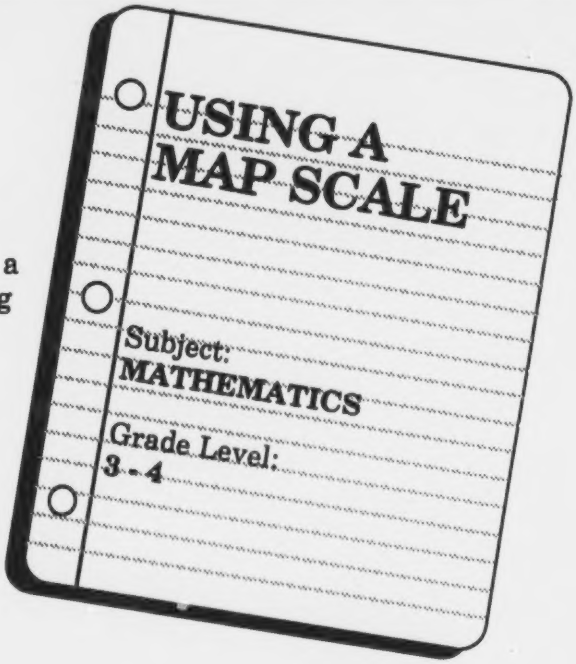

USING A MAP SCALE

Subject:
MATHEMATICS

Grade Level:
3 - 4

Concept Statement

Distances on a map are drawn to scale.

Instructional Objective

The student will:

- Approximate distances between cities on a map to the nearest mile or kilometer by using the map scale.

African American Role Model

The student will:

- See that African Americans have made major contributions to the history of the United States.
- Identify at least six landmarks relating to Black history in the United States.

Affective Factors

- *Perceived Utility*- Using map scales is helpful in estimating and planning trips. The landmarks are ways of informing people of contributions of Black Americans.
- *Attitudes* - It may be easier to maintain a positive attitude toward mathematics and science when you understand how these disciplines have contributed to building these important landmarks of Black American historical importance.

Materials

Individual maps
Meter stick
Paper strips
String
United States demonstration map

Vocabulary

Kilometer
Landmark
Map key
Scale drawing

Teaching Procedures

- Display a large United States map. Ask the students to describe what are some of the things a map can show. As students name them the teacher should list them on the chalkboard. Discuss that locations on a map are not as close as they seem since maps are constructed according to a particular scale. Have students locate their town, county, or state. Help the students find the scale and read it. Demonstrate how to use the scale by measuring the distance between two cities with a string, paper strip, or meter stick. Refer to the scale and convert measurements accordingly. Discuss the meaning of kilometer as 1,000 meters and that it measures out to be a little less than a mile.

- Have the students read the handout, ***Black History Landmarks*** (pages M-126 through M-128). Identify, along with the students, the cities where these famous landmarks are located. Have the students use the ***Map of the United States*** (page M-129) to measure distances between any two cities using a ruler, string or strip, and the map scale on their maps. Students should mark the string or paper at each point, and then measure the paper or string along the map scale to find the distance in miles and kilometers.
- Have the students complete the ***Black History Landmarks Quiz*** (page M-130).
- Have the students read the biography, ***Matthew Henson: Explorer*** (page M-131). Discuss with students the mapping skills Matthew Henson used when planning his trip to the North Pole.

Follow-up Activities

- Take a make-believe trip to six landmarks and complete the following:
    - approximate the mileage from city to city
    - find out how long it will take
    - find the best route
    - identify lodging
    - approximate expenses
- See Section H of *"Appendix III: Resources for Incorporating African American Role Models into Mathematics and Science"* for a list of other famous Black landmarks.
- Have the students research and report on other landmarks of Black history that are not listed.
- Visit a landmark near the school.

Resources

A Salute to Black Pioneers. Chicago: Empak Enterprises, 1986.

African American Encyclopedias. (One set should be in the school library):

A. *Afro-American Encyclopedia*. Educational Book Publishers, 10 volumes.
B. *Encyclopedia of Black America,* Da Capo Press, 1984.
C. *International Library of Negro-Life History,* Association of Afro-American Life and History, 10 volumes.

American Visions Magazine. Washington, D.C.: The Visions Foundation (June 1990) 5:3.

Arnold, Caroline. *Maps and Globes: Fun, Facts, and Activities*. New York: F. Watts, 1984.

Brenner, Barbara. *Wagon Wheels*. New York: Harper & Row Publishers, 1978.

Duncan, E., N. C. Quast and Mary Ann Haubner. *Mathematics Teacher's Resource Books.* Boston: Houghton Mifflin Company, 1985.

Madden, James. *The Wonderful World of Maps.* Maplewood, NJ: Hammond, 1986.

Ploski, Harry A. and James Williams. (Eds.) *The Negro Almanac: A Reference Work on the African American.* (Fifth Edition) Detroit: Gale Research, Inc., 1989.

Tidd, Charles and George Sullivan. *Essential Map Skills.* Maplewood, NJ: Hammond, 1985.

Tinling, Marion. *Women Remembered: A Guide to Landmarks of Women's History in the United States.* New York: Greenwood Press, 1986.

U.S. Department of the Interior. *Catalogue of National Historic Landmarks.* Washington, D.C.: 1986.

Weiss, Harvey. *Maps: How to Get From Here to There.* Boston: Houghton Mifflin Company, 1991.

Handout:

Black History Landmarks

- **Frederick Douglass' Home - Cedar Hill - Washington, D.C.**

  Mr. Douglass was a self-educated man, who later became an eloquent spokesperson. He is called the Father of the Civil Rights Movement. His house overlooks the Anacostia River and the U.S. Capitol. Visitors to his home can see a documentary film on Douglass' life as well as some of his personal documents and writings. The house also contains Mr. Douglass' original furniture and personal belongings. Behind the main house stands a small, one room house called the Growlery. Mr. Douglass built the Growlery so he would have a place where he could go to think and work without being disturbed. This house contains a fireplace, a desk, and a leather couch.

- **Meharry Medical School - Nashville, Tennessee**

  This is the largest predominantly African American medical school in the country and is credited with graduating the largest number of African American doctors in the United States. Founded in 1876, the school is named after Samuel Meharry. One day while Mr. Meharry was on family business, his wagon became trapped in the mud. African Americans who saw that he needed help came to his rescue and gave him a place to stay for the night. He didn't have any money with him, but promised to repay them for their kindness. Years later when he became a successful businessman, Mr. Meharry donated money to establish a medical school for African Americans. Today, Meharry Medical School is a leading medical research and training facility.

- **Dr. Martin Luther King, Jr., National Historic Site - Atlanta, Georgia**

  This historic site, named after the great civil rights leader Dr. Martin Luther King, Jr., is located on Auburn Avenue in Atlanta. Visitors to the site can see the fourteen room house in which Dr. King was born, as well as the church which his father and grandfather pastored. The Center for Non-Violent Social Change is also located on the same street. This is a museum honoring Dr. King's life and his work.

Continued on next page

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- **Tuskegee Institute National Historic Site - Tuskegee, Alabama**

This site is a living tribute to Booker T. Washington, the first president of Tuskegee University, and George Washington Carver, its most famous teacher. Booker T. Washington was an educator and civil rights leader. Mr. Washington came to Tuskegee when there were no buildings to hold classes in. He taught his students how to construct buildings so that they could have class and taught them how to grow crops so that they could have food to eat. The students then went out and taught others how to do the same.

George Washington Carver was a brilliant scientist and a scholar. As head of the agricultural department, he emphasized taking ordinary things like dirt and clay and making them into other things like paint and plastic. This thinking lead Mr. Carver to discover hundreds of uses for many things like the sweet potato and the peanut.

On campus, the Orientation Center is a museum honoring Mr. Carver's life and work, and gives a historical view of Tuskegee. Many of the landmarks and buildings were constructed by students. There is also a sculpture of Mr. Washington "lifting the veil of ignorance from his fellow men." Also on the campus is the Daniel "Chappie" James Aerospace Center. General James was a graduate of Tuskegee and the first African American four star general in the U.S. Army. He was also a fighter pilot, a war hero, and a civil rights leader. A plaque honoring the Tuskegee Airmen is in the plaza of the Center along with a jet airplane. The Tuskegee Airmen were a group of exceptional African American fighter pilots during World War II.

- **Fort Davis National Historic Site - Fort Davis, Texas**

This site is a tribute to the greatest victory won by the Tenth Unit. This unit was composed of African American soldiers who served in the West after the Civil War and protected individuals traveling across West Texas. Lieutenant Henry O. Flipper, the first African American graduate of West Point, was also a member of the unit. The historic site contains a recreated version of a frontier military post, a museum, as well as restored soldiers quarters.

- **Louis Armstrong Park - New Orleans, Louisiana**

This park named after the great jazz musician is located across from the French Quarter in the cultural center of the city. After his death in 1971, an African American sculptress, Elizabeth Catlett, designed a

Continued on next page

statue in his honor. The statue shows Mr. Armstrong with a trumpet in his hand.

- **Provident Hospital - Chicago, Illinois**
  Provident Hospital was established in 1891 by Dr. Daniel Hale Williams, the first person to perform open heart surgery. Dr. Williams was aware of the struggles that African Americans had finding hospitals that would not only treat them, but also train African Americans to become doctors and nurses. He felt that the only alternative was to establish an African American run hospital.

- **Motown Museum - Detroit, Michigan**
  This museum is the former headquarters of Motown Records. The Motown record label gave such entertainers as the Jackson Five, the Supremes, the Temptations, Marvin Gaye, and Stevie Wonder their starts in the music industry. The museum contains mementoes of the labels biggest stars and a restored recording studio. Motown Records was started by Barry Gordy, Jr., a former assembly line worker and songwriter. Mr. Gordy started his own record label in an old house in Detroit, where he recorded songs of friends and talented young people in the area. In 1971, Mr. Gordy left Detroit and moved to Los Angeles in order to expand into motion pictures and television. Today, a sign hangs in front of the original house in Detroit that reads "Hittsville, U.S.A."

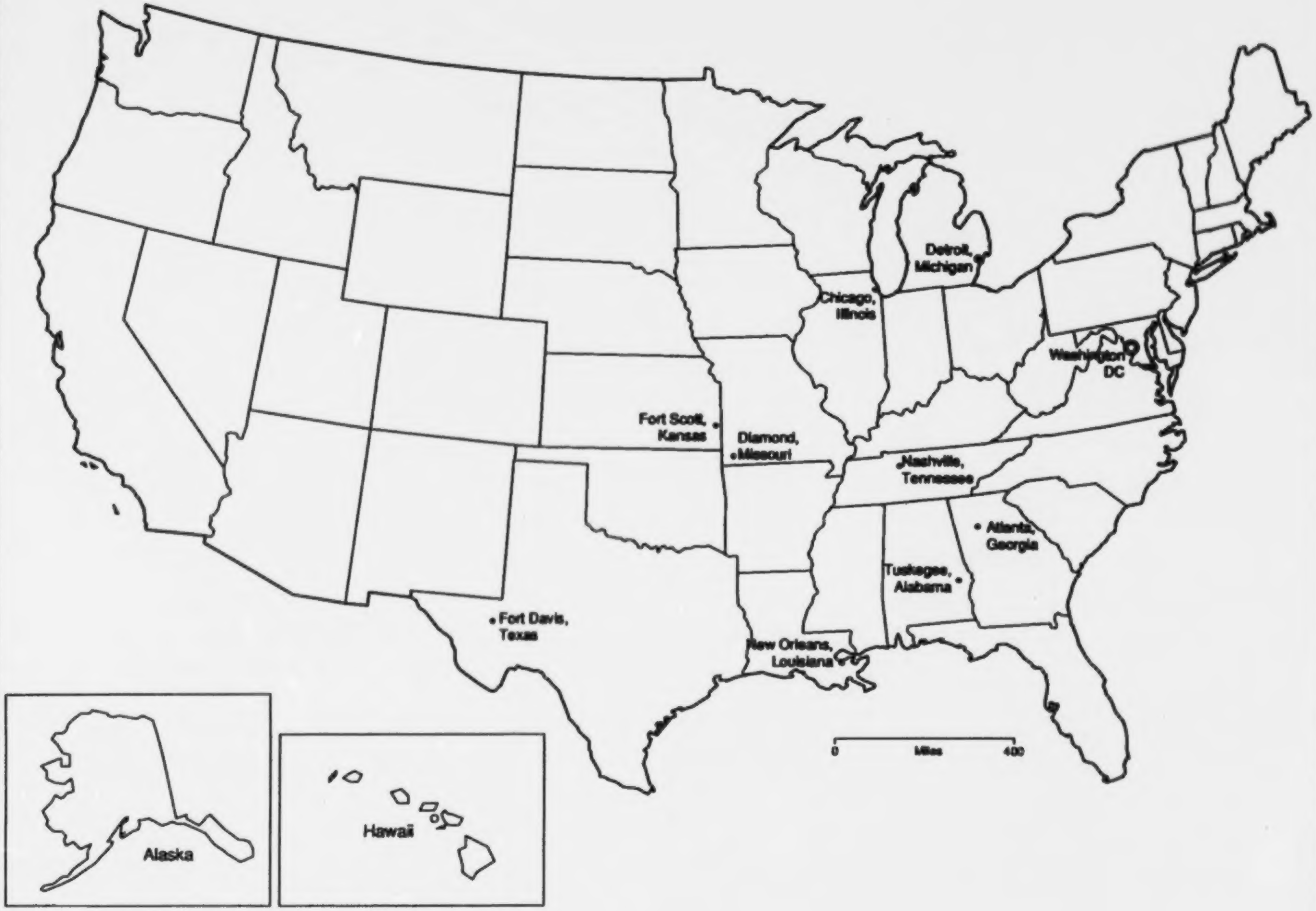
- **Fort Scott National Historic Site - Fort Scott, Kansas**
  Fort Scott is the site where the first African American infantry to serve in the Civil War was stationed. The Fort was built to protect travelers on the Santa Fe trail and to keep peace between the Native Americans and the settlers. Today, the Fort has been restored to the way it looked in the 1840's.

- **George Washington Carver Homestead - Diamond, Missouri**
  The first national monument to honor a Black person, this complex of landmarks includes a number of interesting features: the cabin where the great inventor spent his childhood, a statue of Carver as a boy, and an accompanying bust of Carver as a man. There is also a vistors' center and a small museum with memorabilia.

Name ____________________ Date ____________________

Worksheet:

Map of the United States



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M-129

Name ______________________________ Date ____________________

Worksheet:

Black History Landmarks Quiz

Write the number of the landmark in the box next to the state in which it is located.

1. **Frederick Douglass' Home**
House containing the original furniture and personal belongings of the Father of the Civil Rights Movement.

2. **Meharry Medical School**
The largest predominantly African American medical school in the United States, established in 1876 with money donated by businessman Samuel Meharry.

3. **Dr. Martin Luther King, Jr., National Historic Site**
An historic site with the fourteen room house in which Dr. King was born, and the church his father and grandfather pastored.

4. **Tuskegee Institute National Historic Site**
An agricultural research center that opened with Booker T. Washington as its first president.

5. **Fort Davis National Historic Site**
A tribute to the Tenth Unit, an African American military force which protected individuals traveling across West Texas.

6. **Louis Armstrong Park**
Named after the jazz musician, this park holds a statue of Armstrong with a trumpet in his hand.

7. **Provident Hospital**
Established in 1891 to train African Americans who wanted to become doctors and nurses, and to treat African Americans who needed medical care.

8. **Motown Museum**
Former headquarters of Motown Records, this museum has mementoes of Motown's biggest stars.

9. **Fort Scott National Historic Site**
Restored to look as it did in the 1840's, this is where the first African American infantry to serve in the Civil War was stationed.

10. **George Washington Carver Homestead**
A national landmark of the site of Dr. Carver's birthplace. Dr. Carver was a great inventor, scientist, and scholar.

☐ **Georgia**

☐ **Washington, D.C.**

☐ **Texas**

☐ **Michigan**

☐ **Alabama**

☐ **Missouri**

☐ **Tennessee**

☐ **Illinois**

☐ **Kansas**

☐ **Louisiana**

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Biography:

Matthew Henson:

Explorer

(1866-1955)

Matthew Henson was a famous explorer who became the first person to stand at the North Pole. He was a brave and courageous man who covered many miles of ice and snow in freezing temperatures to reach his goal.

Matthew was born in Charles County, Maryland; however, in order to escape racial violence, he and his parents were forced to move to the outskirts of Washington, D.C. When he was seven years old his mother died. His father, unable to raise him by himself, sent young Matthew to live with his uncle.

Matthew became an orphan at age 13, when his father died and his uncle could no longer care for him. He was then taken in by a kind woman named Jenny who let him work as a waiter and dishwasher at her restaurant.

Working at the restaurant, he met an old sailor named Baltimore Jack who talked to him about life on the sea. These stories inspired Matthew to travel. He then walked 40 miles to Baltimore and became a cabin boy on a ship. The ship's captain was so impressed with him that he taught him not only how to read and write, but also how to become a seaman. It was on this ship that he learned the importance of education and knowledge in order to gain respect from others.

After the captain died, Mr. Henson left the ship and took a variety of odd jobs. When he was twenty-years old he met Robert Peary, a navy officer who was planning a surveying expedition. For the next twenty-two years the two men traveled on many exciting and dangerous expeditions trying to reach the North Pole. Finally, on April 7, 1908, after many failures and difficult times, Mr. Henson became the first person to reach the North Pole. His accomplishments have earned him many awards; perhaps the greatest award is the building at Dillard University in Louisiana, which is named after him.

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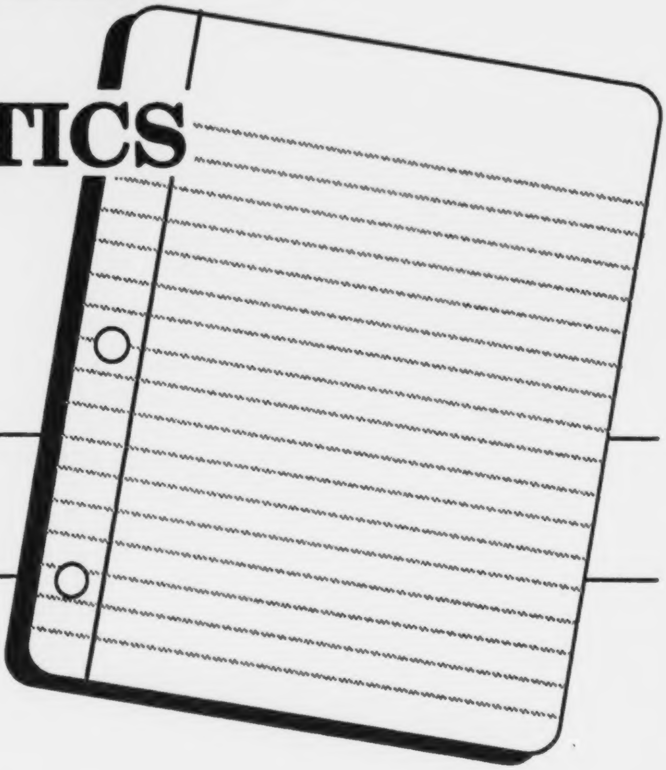
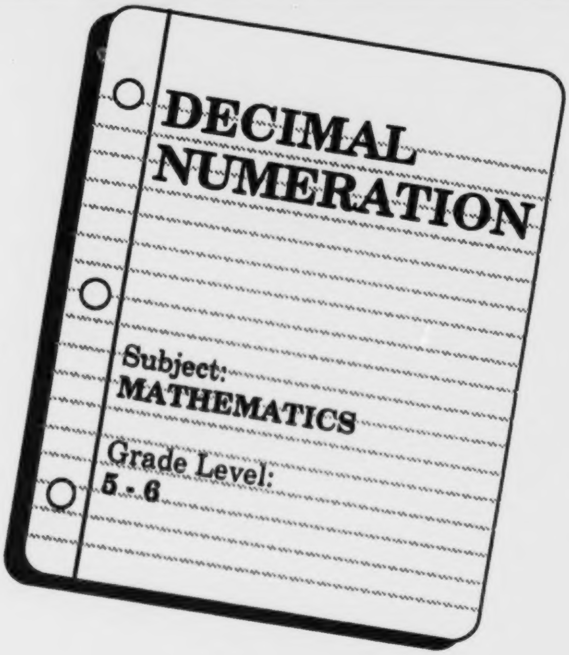
INTRODUCING AFRICAN AMERICAN ROLE MODELS INTO MATHEMATICS LESSON PLANS



Grades 5 - 6



DECIMAL NUMERATION

Subject:
MATHEMATICS

Grade Level:
5 - 6

Concept Statement

Decimal numbers are used by health care professionals.

Instructional Objectives

The student will:

- Convert percents to decimals.
- Interpret the meaning of decimal values in a situational context.

African American Role Models

The student will:

- Identify Black Americans and their contributions to our society.

Affective Factor

- *Perceived Utility* - Illustrate how useful mathematics is in medicine.

Material

Calculator

Vocabulary

Apparatus
CC
Cubic Centimeter
Glucose Solution
Interval
Intravenous Feeding
Rate of Flow

Teaching Procedures

- Invite the school nurse, a medical doctor, or other medical professional to discuss with the class the process of administering nutrients through intravenous feeding.
- Distribute worksheet, ***Decimals in Medicine*** (pages M-135 through M-138).
- Form groups of 2 or 3 students and have the students discuss their responses to ***Decimals in Medicine.*** Encourage students to reach a consensus for each response, if possible. If a consensus is not possible, students should still be able to defend their responses. Refer to ***Decimals in Medicine*** answer sheet (pages M-139 through M-140).
- Distribute worksheet, ***Group Report Summary*** (page M-141).
- Distribute worksheet, ***Follow-up: Decimals in Medicine*** (pages M-142 through M-143). Refer to ***Follow-up: Decimals in Medicine*** answer sheet (page M-144).

- Read the biographies, ***Dr. Benjamin Carson: Doctor*** (page M-145), ***Dr. Charles R. Drew: Doctor*** (page M-147) ***and Dr. Daniel Hale Williams: Doctor*** (page M-148).

Follow-up Activities

- Have students determine the length of time it would take to receive 1000 cc of 5% glucose solution if the rate of flow is changed to 25 drops per minute.
- Have students read the excerpt from *How Do They Do That?* entitled ***How Does a Contac Time-Release Capsule Know When to Release?*** (page M-149), and write an analysis of the mathematics associated with the process of time-releasing.

Resources

Calder, Ritchie. *The Wonderful World of Medicine.* Garden City, NY: Doubleday and Company, Inc., 1969.

Carry, Helen Ward and Levi Lathen. *Black America Today and Yesterday.* New York: Marvel Education Company, 1985.

Carson, Ben. *Gifted Hands: The Ben Carson Story.* Grand Rapids, MI: Zondervan Books, 1990.

Carson, Ben. *Think Big: Unleashing Your Potential For Excellence.* Grand Rapids, MI: Zondervan Publishing House, 1992.

Davis, Marianna. (Ed.) *Contributions of Black Women in America.* Columbia, SC: Kenday Press, Inc., 1982.

Freedman, Russell and James Morriss. *The Brains of Animals and Man.* New York: Holiday House, Inc., 1972.

Glemser, Bernard. *All About the Human Body.* New York: Random House, 1958.

Kim, Junu Bryan. "In Good Hands." *Vegetarian Times.* Vegetarian Times, Inc., June 1990, 32-42.

Silverstein, Alvin and Virginia. *World of the Brain.* New York: William Morrow and Co., Inc., 1986.

Sutton, Carolyn. *How Do They Do That?* New York: Hilltown Press, 1982.

Name ______________________________ Date ________________

Worksheet:

Decimals in Medicine

A friend of yours has been hospitalized and has improved to the point where she will be released to go home at the end of next week. Tomorrow will be the final day your friend will need to be fed intravenously.

Today Nurse Ramirez will administer 1000 cubic centimeters (cc) of a 5% glucose solution over an 8 hour period. The apparatus for the intravenous feeding is adjusted, and Nurse Ramirez checks the flow of the solution by counting the number of drops for 1 minute. How many drops should he count if 1 cc equals 15 drops? ________________

1. The glucose solution consists of sugar and water. For each 100 parts of solution, how many parts will be sugar? How many parts will be water? How do you know?

2. Explain how you would determine the number of parts of sugar if you knew that there were 200 parts of solution?

Continued on next page

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3. Describe what a 3.5% glucose solution would be.

4. Suppose you have a 3.5% glucose solution. If there are 50 parts in the solution, how many of the parts will be sugar? How many parts will be water? How do you know this?

5. How much of the 5% glucose solution is your friend to receive?

6. Over how long a period of time is your friend to receive this solution?

7. If the flow of the solution is constant, how many cubic centimeters of 5% glucose solution will your friend receive in 1 hour?

Continued on next page

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8. What is the unit associated with your answer to problem #7? How is this unit used to verify the accuracy of the answer?

9. How many drops of 5% glucose solution are in 1 cc?

10. How would you determine the number of drops your friend would get in 1 hour?

11. How long will Nurse Ramirez count?

Continued on next page

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12. The solution must flow over a period of 8 hours. Nurse Ramirez counts the number of drops for 1 minute. Explain what conversion of units must be made before you can determine the number of drops of solution he must count during the 1 minute interval.

13. How would you find the number of drops per minute?

14. Use the procedure you described in problem #13 and determine the number of drops of solution Nurse Ramirez must count for 1 minute in order to ensure your friend receives the 1000 cc over an 8 hour period.

Answer Sheet:

Decimals in Medicine

1. 5 parts will be sugar; 95 parts will be water.

   5% means 5 parts out of 100 so 5 parts will be sugar. That leaves 95 parts for the water.

2. Double the amount of sugar since 100 has been doubled. There would be 10 parts of sugar.

   Set up a proportion and solve it. $\frac{5}{100} = \frac{n}{200}$ $n = 10$

3. 35 parts out of 1000 would be sugar and 965 parts would be water.

4. $\frac{35}{1000} = \frac{x}{50}$ $x = 1.75$

   1.75 parts are sugar and 48.25 parts are water. Solving the proportion tells me this.

5. 1000 cc

6. 8 hrs.

7. $\frac{1000\text{ cc}}{8\text{ hr}} = \frac{125\text{ cc}}{\text{hr}}$

8. $\frac{\text{cc}}{\text{hr}}$

   The units are cc per hour which tells the amount in the given time period which is what the problem asked for.

9. 15 drops.

10. Multiply the number of cc per hour by 15.

Continued on next page

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11. One minute.

12. 1 hour must be changed to 60 minutes.

13. Divide the amount of solution by 8 hours.
Multiply the answer by 15.
Divide that answer by 60.

14. $\frac{1000\text{ cc}}{8\text{ hr}} = \frac{125\text{cc}}{\text{hr}}$

$$\frac{125\text{ cc}}{\text{hr}} \times \frac{15\text{ drops}}{1\text{ cc}} = \frac{1875\text{ drops}}{\text{hr}}$$

$$\frac{1875\text{ drops}}{\text{hr}} \div \frac{60\text{ minutes}}{1\text{ hour}} = \frac{31.25\text{ drops}}{\text{minute}}$$

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Name ______________________________ Date ______________

Worksheet:

Group Report Summary

Write a summary of the discussion which took place in your group. Include in your summary, comments related to your understanding of the problems, the responses agreed upon by your group members, responses for which there was not agreement, any changes you made in your responses, and the reason(s) for making those changes.

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Name ______________________________ Date ________________

Worksheet:

Follow-up: Decimals in Medicine

1. If your friend was to receive 1000 cc of a 5% glucose solution over an 8 hour period and there are 15 drops in 1 cc of solution, Nurse Ramirez will count 31.25 drops in the 1 minute interval.

   For each statement below, write the reason which justifies that statement.

STATEMENT	*REASON*
a. $\frac{1000\text{ cc}}{8\text{ hr}} = \frac{125\text{ cc}}{\text{hr}}$	a.
b. $\frac{125\ \cancel{\text{cc}}}{\text{hr}} \times \frac{15\text{ drops}}{\cancel{\text{cc}}} = \frac{1875\text{ drops}}{\text{hr}}$	b.
c. $\frac{\frac{1875\text{ drops}}{\cancel{\text{hr}}}}{\frac{60\text{ min}}{\cancel{\text{hr}}}} = \frac{31.25\text{ drops}}{\text{min}}$	c.

2. Is it possible for Nurse Ramirez to accurately count 31.25 drops per minute? Why or why not?

Continued on next page

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3. What would be a reasonable estimate of the number of drops Nurse Ramirez would count in the 1 minute interval? Why did you choose this number?

4. Does your answer to problem #3 affect the length of time the 1000 cc will have to flow? Explain your response.

Answer Sheet:

Follow-up: Decimals in Medicine

1a. to find the amount of solution to the be received each hour.

1b. to find the number of drops to be counted each hour.

1c. to find the number of drops to be counted each minute.

2. No, you can't count a part of a drop.

Yes, technology will allow the entering of 31.25 digitally on the machine.

3. 31 because 31.25 rounds to 31.

32 because it is the next whole number of drops after 31.

4. Yes. 31 drops each minute means the solution will flow a little longer than 8 hours.

Yes. 32 drops each minute means the solution will flow a little shorter than 8 hours.

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Biography:

Dr. Benjamin S. Carson:

Doctor

(1951-)

Dr. Benjamin Carson is a famous pediatric neurosurgeon. A pediatric neurosurgeon is a doctor who performs brain surgery on children. Dr. Carson is best known for an operation which separated a set of siamese twins who were joined at the back of their heads. The operation took five months to plan and twenty-two hours to execute.

Dr. Carson was raised in the inner-city streets of Detroit, Michigan. When he was eight years old his parents divorced. His mother, Sonya Carson, worked several low paying jobs to raise Benjamin and his brother. Dr. Carson credits his success in life to his mother, who taught both her sons to believe that one day they would become successful.

Dr. Carson was not a good student when he was in the fifth grade; he was ranked the last student in his class. His mother knew that it was time to do something to turn Benjamin around. She limited the amount of television that he and his brother could watch, and made them read two books a week and write book reports. She could not read these reports herself because she only had a third grade education, but her concern and discipline led to a more positive self-image for Benjamin as a student. Dr. Carson moved from the bottom of his class to the top by the time he entered 6th grade.

This strong determination earned Dr. Carson a full scholarship to Yale University and helped him to graduate from the University of Michigan Medical School. At age 33, Dr. Carson was named Chief of Pediatric Neurosurgery at Johns Hopkins Medical Center. Dr. Carson has also received worldwide attention for successfully performing delicate brain operations on children.

Dr. Carson has written two books, *Think Big: Unleashing Your Potential for Excellence* and *Gifted Hands*, in an effort to encourage others to be the best that they can be.

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Dr. Benjamin S. Carson

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Biography:

Dr. Charles R. Drew:

Doctor

(1906-1950)

Dr. Drew was a leader in the field of blood preservation research. He was responsible for establishing the American Red Cross Blood bank. A blood bank is a place where blood is kept in a special form called plasma until it is needed for surgery. Plasma is the liquid watery part of blood. Blood banks have saved the lives of thousands of people who would have died had they not had blood transfusions.

Born in Washington, D.C., Dr. Drew graduated from Amherst College where he earned the prestigious Messman Trophy for having brought the most honor to the school during his four years there. Dr. Drew was also a star athlete on both the track and football teams. After earning his medical degree, Dr. Drew began his blood preservation research at Columbia University.

He later became a professor at Howard University Medical School and Chief of Surgery. He also became Chief of Staff at the Freedman's Hospital. In 1940 he was asked by the country of England to set up its first blood bank. In 1944, Dr. Drew was honored by the NAACP with the Spingarn Medal. The Spingarn Medal is given to the African American who has done the most for the advancement of people during the year.

In 1950, while taking a group of science students to a meeting in North Carolina, he fell asleep at the wheel of his car and had a tragic auto accident. Dr. Drew desperately needed a blood transfusion; however, the hospitals in the area would not treat him because he was an African American. Dr. Charles Drew died because he could not receive the blood treatment that he himself had developed.

Before Blacks and some Whites protested and demonstrated, thereby successfully changing laws through the 1964 Civil Rights Act, Blacks were often not allowed to attend colleges or universities with Whites, travel on the same buses or trains as Whites, or receive treatment in the same hospitals as White people.

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Biography:

Dr. Daniel Hale Williams:

Doctor

(1858-1931)

Dr. Williams was the first person to perform open heart surgery. He performed this very difficult procedure at a time when doctors did not have x-ray machines, anesthetics, or the ability to give blood transfusions. This operation was a success and the patient lived for twenty more years.

At age eleven, Dr. Williams' father died and his mother deserted him, leaving him an orphan. In order to support himself, he trained to be a cobbler. A cobbler is a person who makes shoes. When he needed extra money, Dr. Williams also took a part-time job as a barber. It was at this job that one of his customers encouraged him to become a medical doctor.

After many long years of studying, Dr. Williams finally graduated from the Chicago Medical College. Dr. Williams was extremely fortunate to have the opportunity to become a doctor. He then opened a hospital which trained African Americans to become doctors and nurses, because he knew that the opportunities were so limited for Black people to practice medicine. Daniel Hale Williams is a role model for everyone.

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Handout:

How Does a Contac Time-Release Capsule Know When to Release?

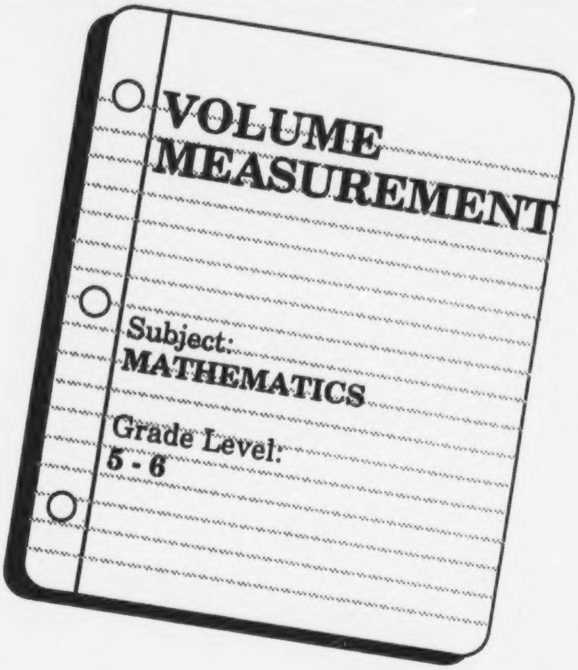
In the late 1940's Don MacDonnell of Smith Kline & French, a pharmaceutical company, went into his local grocery store and lighted upon a jar of "petites" – tiny candy beads used for decorating pastry. Scientists at the time were searching for a form of medication that would release slowly, and the candy provided MacDonnell with a clue.

Several years of research and testing resulted in the manufacture of "the capsules that think" – capsules containing some 300 to 900 "tiny time pills" which dissolve in the system gradually, freeing the user from having to take additional doses every 3 or 4 hours. The "Spansule" capsule of Smith Kline & French, used for a variety of medicines including Contac, is designed to dissolve evenly and slowly with no "peaks," "valleys," or "fade-outs." But how do the tiny pills or pellets inside "know" when to go to work?

Each pellet consists of a central core of sugar and starch, known as a starting core. Millions of the cores are placed in a large drum that resembles a cement mixer. As the drum rotates, medication is added as a powder or solution and distributed evenly over the cores. They are then coated with digestible dyes for identification – not of the individual pellets, but of the product as a whole. Finally, an outer waxy coating is applied in the same manner as the medication. Pellets in different pans receive different amounts of coating, so that some will release almost immediately, others more slowly, as the digestive system wears off the waxy coating.

Of the 600 tiny pellets in one Contac Spansule, some go to work about 30 minutes after ingestion. The pellets are not designed to release, say, all the antihistamines first, then all the decongestants, and so on, but rather to distribute medications evenly over a 12-hour period.

How Do They Do That? by Carolyn Sutton. Reprinted with permission. Hilltown Press, New York: NY, 1992.



VOLUME MEASUREMENT

Subject:
MATHEMATICS

Grade Level:
5 - 6

Concept Statement

Cubic units measure space.

Instructional Objective

The student will:

- Determine the volume of models of rectangular prisms in cubic units.

African American Role Models

The student will:

- Identify Black inventors, for example: Madame C. J. Walker invented the hair straightening method, Alice Parker invented the heating furnace, and Frederick Jones invented the first automatic refrigeration system for long haul trucks.

Affective Factors

- *Perceived Utility* - These inventors possessed a solid understanding of mathematics and science. It was this knowledge that enabled them to create inventions.
- *Significant Others* - The teacher can help highlight the important contributions of Black American inventors.

Vocabulary

Capacity
Cubic unit
Volume

Teaching Procedures

- Use models of rectangular prisms, cubic centimeters, or cubic inches to demonstrate measuring the capacity of the prism. Allow students to do the same.
- Have students complete worksheets #1 and #2 on ***Determining the Volume of Rectangular Prisms*** (pages M-153 through M-155).
- Distribute and discuss biographies, ***Six Inventors: Henrietta M. Bradberry, Meredith Gourdine, Frederick M. Jones, Maurice Lee, Sr., Alice H. Parker, and Madame C.J. Walker*** (pages M-156 through M-158), the photograph of Madame C.J. Walker (page M-159), ***Henrietta Bradberry's Patent Design for the Torpedo Discharge Means*** (page M-160), and ***Alice H. Parker's Patent Design for the Heating Furnace*** (pages M-161 through M-162). Discuss how these inventors needed to understand and apply the concept of volume when creating their inventions.

Follow-up Activities

- Ask the students to research and report on other similar inventions.
- Have the students write a page on an item they would like to invent in the year 2500. Ask the students to describe its purpose and draw an illustration of their invention.

Resources

Abbott, Janet S. and David W. Wells. *Mathematics Today 6.* (Teacher's Resource Book) Orlando: Harcourt, Brace, Jovanovich Publishers, 1985.

"Black History Month - February, 1983." Detroit: Detroit Public Schools Department of Curriculum Development and Services, 1983.

Bundles, A'Lelia. *Madame C. J. Walker, Entrepreneur.* New York: Chelsea House Publishers, 1990.

Haskins, James. *Outward Dreams: Black Inventors and Their Inventions.* New York: Walker, 1991.

Hayden, Robert C. *Eight Black American Inventors.* Reading, MA: Addison-Wesley, 1972.

Ives, Patricia Carter. *Creativity and Inventions: The Genius of Afro-Americans and Women in the United States and Their Patents.* Arlington, VA: Research Unlimited, 1987.

Thoburn, Forbes Bechtel. *Macmillan Mathematics.* (Teacher's Copying Masters. A Resource Book, Level 5.) New York: Macmillan Publishing Co., 1985.

Name ______________________________ Date ______________

Worksheet #1:

Determining the Volume of Rectangular Prisms

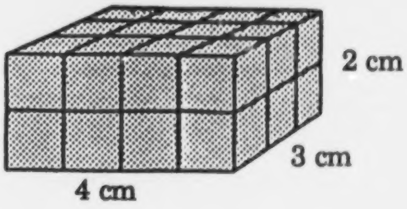
To find the volume of a rectangular prism, multiply the length times the width times the height.

$V = l \times w \times h$

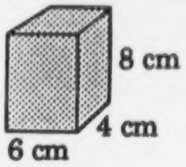
$V = 4 \times 3 \times 2$

$V = 24\ cm^3$

The volume of the rectangular prism is 24 cubic centimeters.



Practice: Find the volume of each figure.

1.


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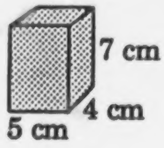

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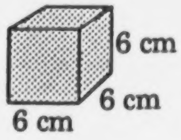

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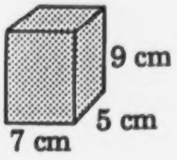

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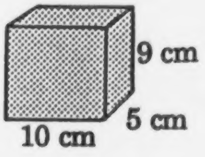

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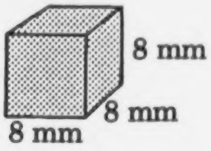

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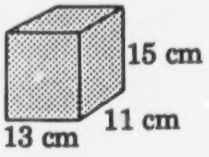

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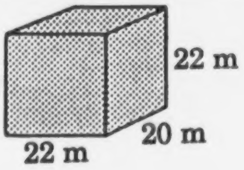

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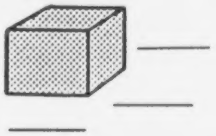
9.


The volume is 32 square units. What are possible dimensions?

Complete:

	Length	*Width*	*Height*	*Volume*
10.	11 m	4 m	5 m	________ m^3
11.	1.4 cm	8 cm	10 cm	________ cm^3
12.	21 cm	1.7 cm	12 cm	________ cm^3

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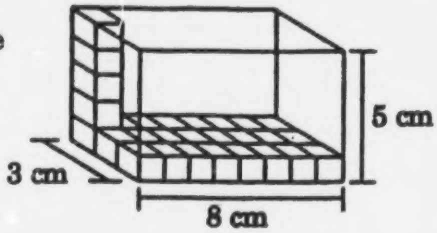
Name ______________________________ Date ______________

Worksheet #2:

Determining the Volume of Rectangular Prisms

Multiply to find the volume of a rectangular prism.



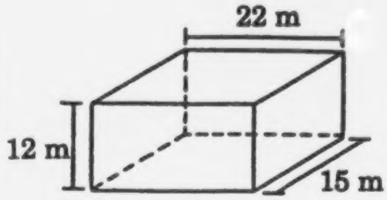
Multiply:

$$\begin{array}{r} 8 \\ \times\ 5 \\ \hline 40 \end{array} \qquad \begin{array}{r} 40 \\ \times\ 3 \\ \hline 120 \end{array}$$

Volume = 120 cm^3

Find the volume of each rectangular prism.

1.



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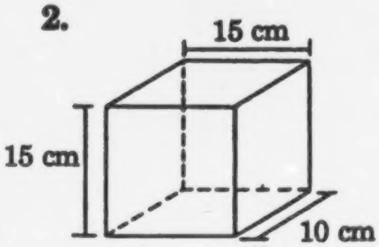
2.



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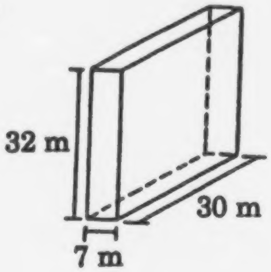
3.



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Find the volume of each rectangular prism to complete this table.

	Length	*Width*	*Height*	*Volume*
4.	24 m	23 m	18 m	________ m^3
5.	20 cm	6 cm	38 cm	________ cm^3
6.	40 m	30 m	5 m	________ m^3
7.	12 cm	12 cm	18 cm	________ cm^3
8.	25 m	22 m	8 m	________ m^3
9.	10 cm	10 cm	100 cm	________ cm^3

Continued on next page

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10. A box is 40 cm long, 20 cm wide, and 15 cm high. What is its volume?

11. A cabinet is 70 cm long, 110 cm high, and 30 cm wide. What is its volume?

12. A well is shaped like a rectangular prism. It measures 4 m long, 4 m wide, and 6 m deep. How many cubic meters of earth are needed to fill it in?

13. The volume is 64 square units. What are some possible dimensions?

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Biographies:

Six Inventors

Henrietta M. Bradberry

(1900-1979)

Henrietta Bradberry invented a bed rack and a torpedo discharge system. Although she only had a high school education and was busy as a housewife and mother, she still found time to develop her ideas into inventions. In 1943, she invented a rack that attached to a bed which would permit air to pass through and refresh worn clothing. During World War II, Henrietta Bradberry invented a torpedo discharge system. This invention, used on submarines, allowed torpedoes to be discharged below the surface of water. Henrietta said that her ideas just came to her while she was busy with her homemaking activities.

Meredith Gourdine

(1929-)

Meredith Gourdine is famous for his pioneering work in electro gas dynamics. Meredith invented a way of producing high voltage electricity from natural gas. Although this process had been known to scientists since the 1700's, no one could figure out how to make the process generate enough electricity for modern needs. He also developed a technique for removing fog from airport runways.

While he was still in college studying physics at Cornell University, he went to the 1952 Olympics in Helsinki and won a silver medal in the broad jump. After graduation, he began working for a major aeronautical company, where he rediscovered an 18th century energy conversion method. Because his employer did not believe in his discovery, he quit and founded his own research and development firm, Gourdine Systems, Inc. Because he believed in himself and worked hard, Meredith Gourdine was able to excel and be successful in many fields, including physics, athletics, and business.

Continued on next page

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Frederick M. Jones

(1892-1961)

Frederick M. Jones was an inventor who received over 60 patents in a variety of areas. A patent is a legal document that protects inventions from being copied.

When he was young, his mother died and he was raised by a priest until he was sixteen. He later became a mechanics helper and a chief mechanic on a farm. In World War I, he developed a series of devices used to change silent movie projections into talking movies. In 1935, he invented the first automatic refrigeration system for long haul trucks. This invention made transporting food without spoilage possible. Later, ships and railway carriers used his refrigeration system on long journeys. He also invented the portable x-ray machine and a theater box office machine that delivers the ticket and the change. Mr. Jones gave us many valuable inventions that are still in use today.

Maurice Lee, Sr.

(19— -   )

In 1958, Maurice Lee, Sr. invented the Smokarama, an automatic barbecue smoker and cooker. The Smokarama pressure cooker cooks 45 pounds of meat in only one hour. Lee graduated from the University of Illinois with a Bachelor's degree in industrial arts. Maurice Lee, Sr. was the mayor of Boley, Oklahoma for 10 years before he produced his invention and turned an old dance hall into a million dollar a year business. He believed that regular barbecuing methods only coated, not cooked, the meat. If smoke was forced into the meat from a number of directions, the meat's taste would be improved. Maurice Lee, Sr. was correct. His invention is used in many fast food restaurant chains across the United States.

Continued on next page

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Alice H. Parker

(18— - 19—)

Alice H. Parker, from Morristown, New Jersey, invented the heating furnace. She received a patent for her invention on December 23, 1919. This furnace regulates and carries heat to various rooms of a building. The unit consists of independently controlled heating units which branch from a common cold air box. Each unit has individual hot air ducts leading to different rooms. Alice Parker's invention is a simple, reliable, and efficient method of gas heating.

Madame C.J. Walker

(1867-1919)

Madame C.J. (Sarah) Walker was the first self-made female millionaire. She was a very creative and ingenious woman. Like many poor rural women with inadequate diets and health conditions, Sarah began to lose her hair. She created a formula to improve her hair condition and cure scalp disorders. She invented hair grease that Black people use to oil their scalps and the straightening comb used to press their hair.

Although she eventually became very wealthy, she had a very difficult life. She lost her parents when she was six years old. She married at the age of fourteen and was a widow with a child at twenty. While washing clothes for other people to support herself, she saved some of this money and organized the Madame C.J. Walker laboratory and training school for salespeople and beauticians. Eventually her company employed over 3,000 people. Her salespeople were called "Walker Agents" and sold her products door to door all over America. They taught good grooming and beauty techniques. Madame C.J. Walker had a very generous heart. She made lots of money and donated large amounts of her money to charities and schools.

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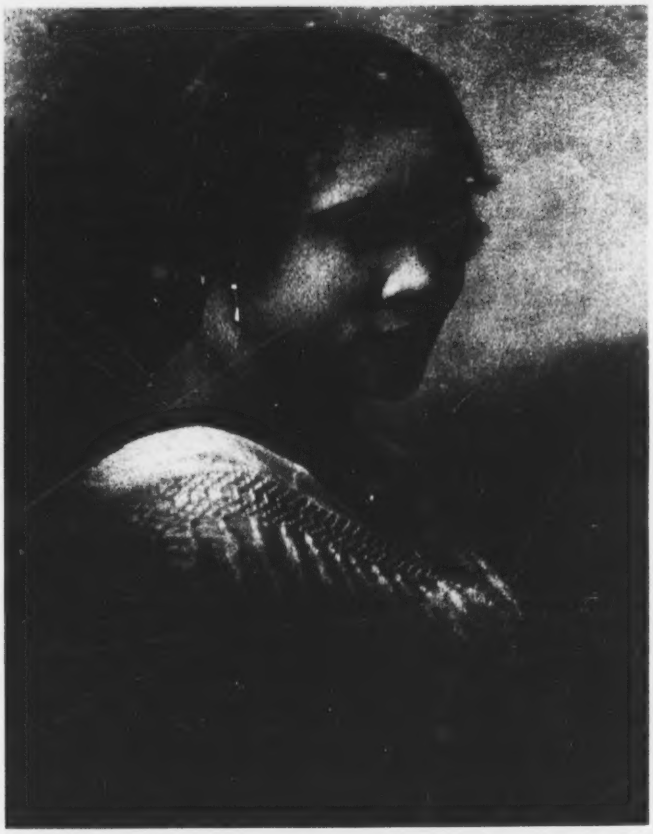
Madame C.J. Walker



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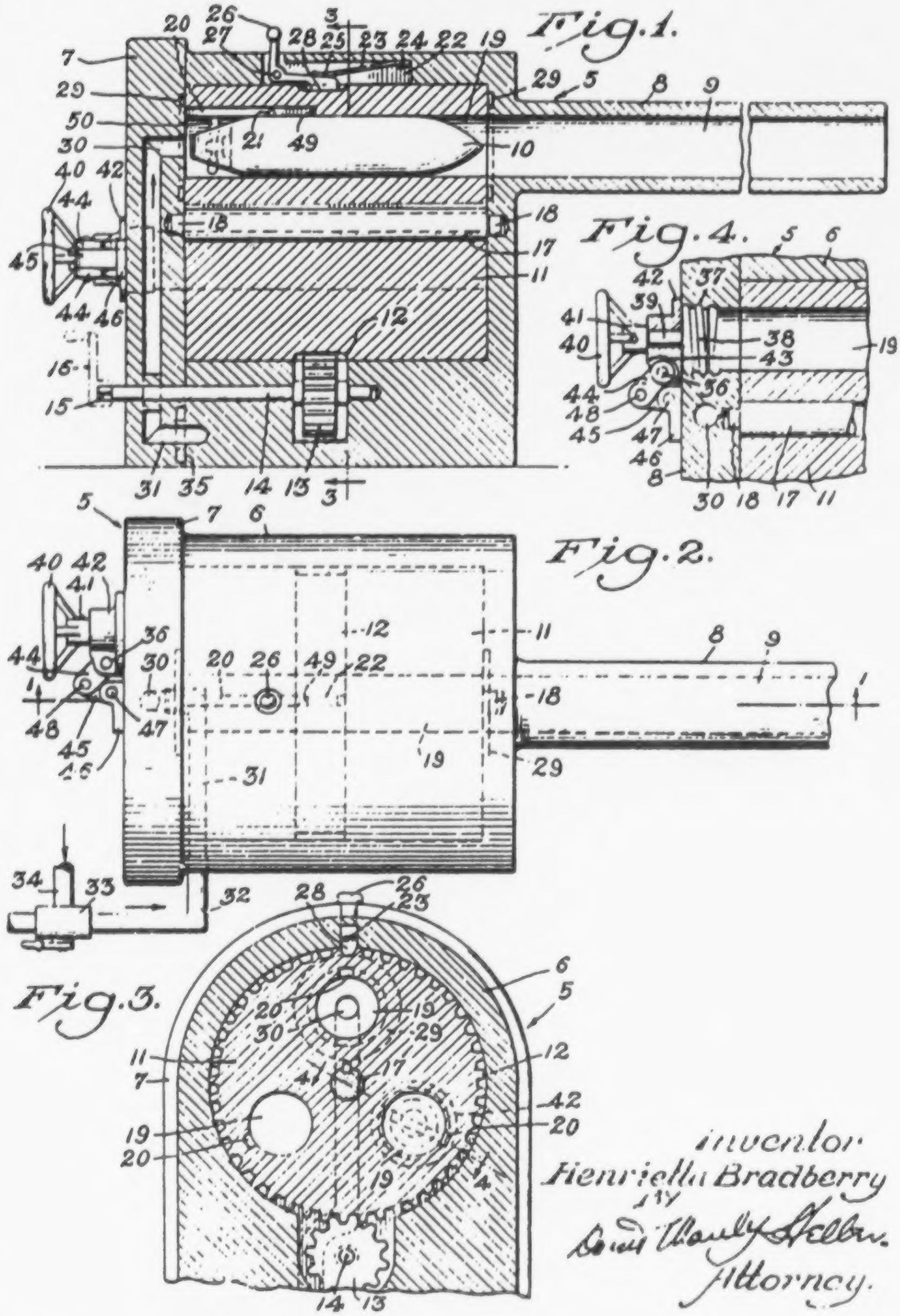
Henrietta Bradberry's Patent Design for the Torpedo Discharge Means

Dec. 11, 1945. H. BRADBERRY 2,390,688

TORPEDO DISCHARGE MEANS

Filed Jan. 8, 1945



Inventor
Henrietta Bradberry
By
Attorney.

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M-160

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Alice H. Parker's Patent Design for the Heating Furnace

A. H. PARKER.
HEATING FURNACE.
APPLICATION FILED JULY 9, 1918.

1,325,905. Patented Dec. 23, 1919.
2 SHEETS—SHEET 1.

Fig. 1.

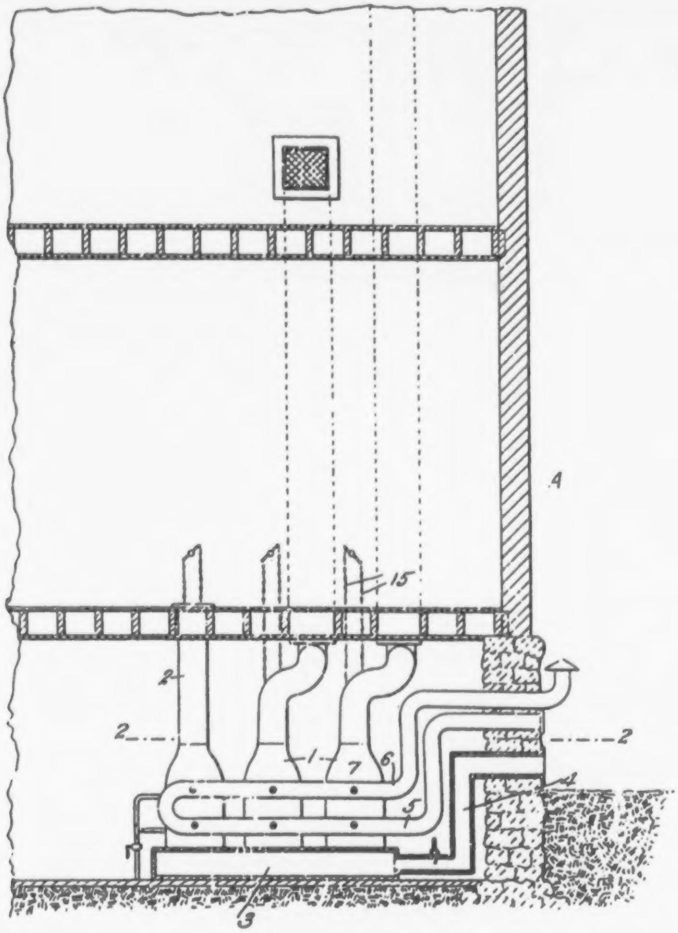
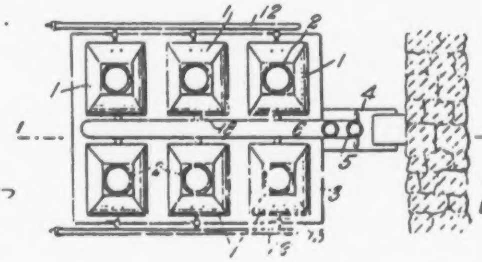


Fig. 2.



WITNESSES
H. T. Walker
C. Bradbury

INVENTOR
Alice H. Parker
BY Munn & Co
ATTORNEYS

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Continued on next page

A. H. PARKER.
HEATING FURNACE.
APPLICATION FILED JULY 9, 1918.

1,325,905. Patented Dec. 23, 1919.

2 SHEETS—SHEET 2.

Fig. 3.

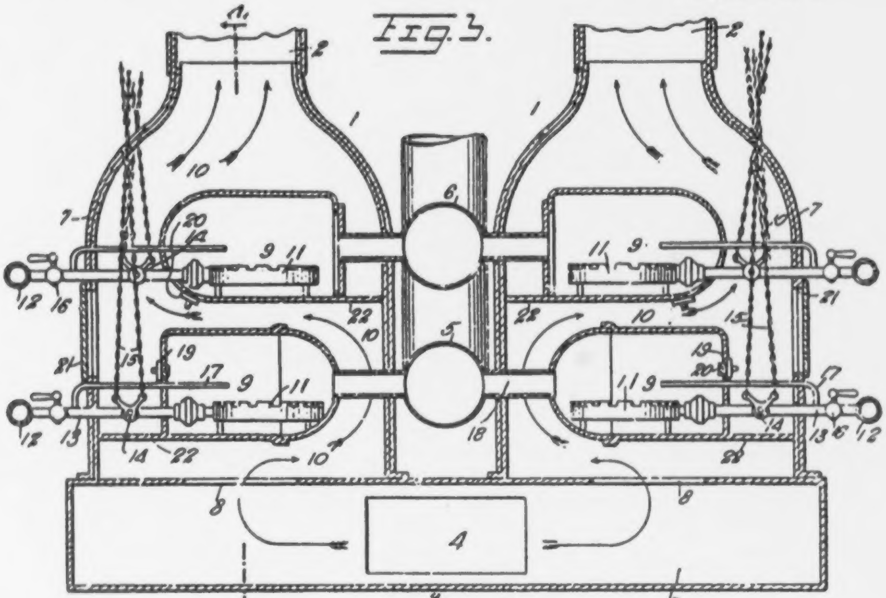
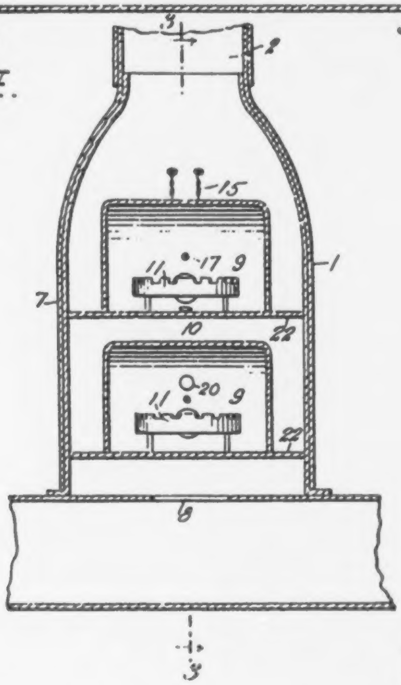


Fig. 4.



WITNESSES
H. J. Walker
C. Bradway

INVENTOR
Alice H. Parker
BY Munn & Co
ATTORNEYS

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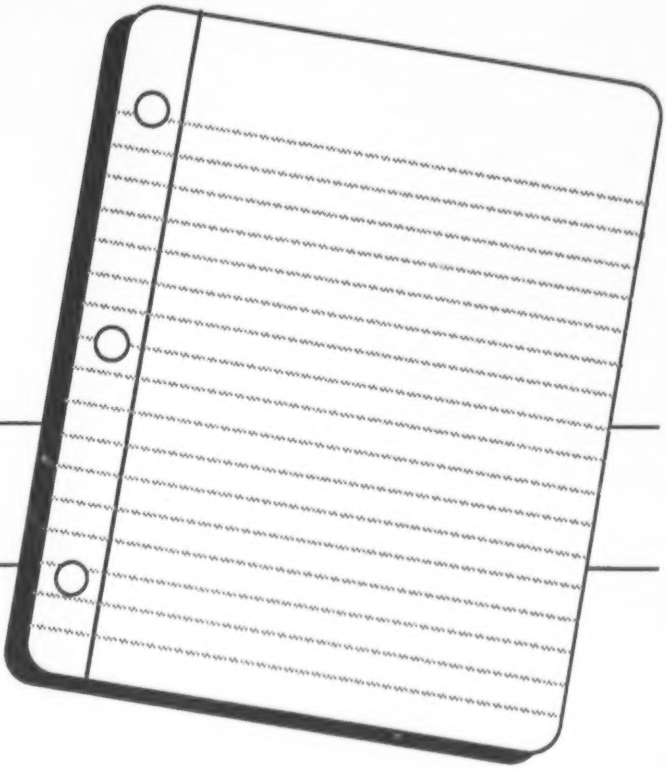
INTRODUCING AFRICAN AMERICAN ROLE MODELS INTO SCIENCE LESSON PLANS

Grades K - 2



GROWING SEEDS AND PLANT PARTS

Subject:
SCIENCE

Grade Level:
K - 2

Concept Statements

- *Many seeds grow in a warm, moist environment.*
- *Most plants have roots, stems, and leaves.*
- *Seeds are the reproductive parts of most plants.*

Instructional Objectives

The student will:

- Group plant parts into seed and non-seed categories.
- Plant and care for seeds.
- Construct a record of plant growth.
- Describe seeds as reproducing their own kind of plants.

African American Role Model

The student will:

- Identify Dr. Charles Stewart Parker as a botanist who discovered and described 39 plant species.

Affective Factors

- *Attitudes* - Students are motivated to watch plants grow from seeds, a "hands-on" activity.
- *Perceived Utility* - Students learn that knowledge of seeds is important in understanding how plants reproduce.
- *Stereotyping* - Students see that Black scientists make important contributions to science and serve as important role models.

Materials

Clear plastic cups
Cotton
Variety of food seeds (bean, grass, pea, corn, radish)
Variety of non-seed plant parts (leaves, roots, stems, bark)
Magnifying glasses
Packet of flower seeds

Vocabulary

Bark
Botanist
Leaves
Plants
Roots
Seeds
Soil
Stems

Teaching Procedures - Lesson 1

- Distribute magnifying glasses, assorted seeds, and a variety of other small plant parts to the students. Have students divide the plant parts into seed and non-seed groups.
- Conduct a brief discussion about seeds and how to make them grow. Distribute clear plastic cups and soil and allow the students to plant three different seeds in their cup. The seeds should be placed between the cup edge and soil so root growth can be observed. Make sure the students water their soil until moist. Leave the cups at room temperature.
- Allow the students to observe and care for their plants over the next few days. Have the students make graphs to record the seeds' development.

Teaching Procedures - Lesson 2

- After the seeds have sprouted, discuss plant parts (roots, stems, leaves), and identify these parts on different plants. Students should draw a picture of one seedling, including labels of plant parts.
- Conduct a discussion about the variety of seeds and plants used in the planting activity. Ask the students to match seeds with the corresponding plants. Students should understand that each kind of plant is different from the other plants and that seeds reproduce plants of their own kind. (Distribute handout, ***Types of Seeds*** page S-4).
- Discuss with students that botanists are scientists who study plants and how they grow. Read to students the biography, ***Dr. Charles Stewart Parker: Botanist*** (page S-5). Describe Dr. Parker as a botanist who discovered 39 different kinds of plants. Conduct a discussion as to how the scientist will know that he or she has discovered something new. Ask students what a botanist might do when a new plant is discovered.
    - Describe the plant
    - Diagram the plant
    - Preserve a leaf
    - Write a description of the plant

  Also, discuss with students what you need to know and do to become a botanist.

Follow-up Activities

- Photograph the development of a plant from seed to maturity. Laminate the photographs and encourage students to place them in their proper order. Students could also be asked to draw the stages of growth from seed to plant.
- Suggest to the students that they investigate the conditions under which seeds germinate. To do this, students might conduct one of these investigations using the following variables:
    - Plant seeds in different kinds of soil (sand, humus, gravel, sawdust).
    - Place planted seeds in cool, warm, and hot areas.
    - Place planted seeds in dark, dim, and light areas.

See the attached discovery guide, ***What Conditions are Best for Seed Growth?*** (page S-6) for a possible approach.

- After a growing period of about 3-5 days, discuss with students which of these conditions are best for seed growth.
- Arrange a trip to a local botanical garden. Try to observe the different ways plants reproduce and differences in plant parts among different plant species.
- Provide the students with cherries (canned or fresh) and ask the students to describe the trees from which they came. They should include a description of healthy cherry trees.
- Make a list of some other plants that Dr. Parker discovered.

Resources

Bates, Jeffrey. *Seeds to Plants: Projects With Biology.* New York: Glouster Press, 1991.

Carle, Eric. *The Tiny Seed.* Saxonville, MA: Picture Book Studio, 1990.

Gibbons, Gail. *From Seed to Plant.* New York: Holiday House, 1991.

Jennings, Terry J. *Seeds and Seedlings.* Chicago: Children's Press, 1988.

Kirkpatrick, Rena K. *Seeds and Weeds.* Milwaukee: Raintree Children's Books, 1985.

Lauber, Patricia and Jerome Wexler. *Seeds - Pop, Stick - Glide.* New York: Grown Publishers, 1981.

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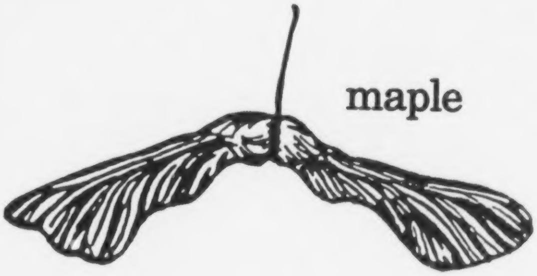
Handout:

Types of Seeds



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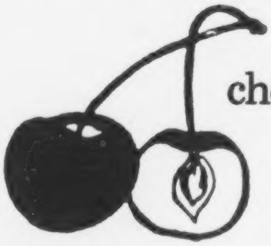

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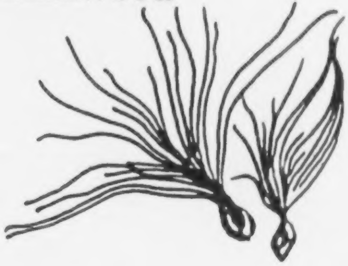

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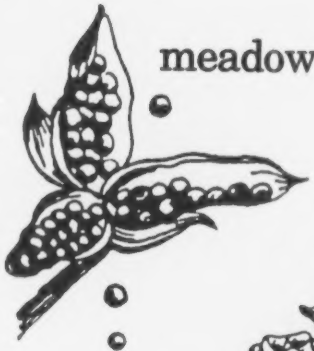
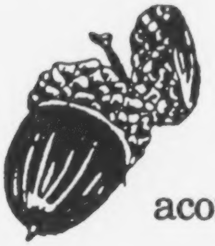
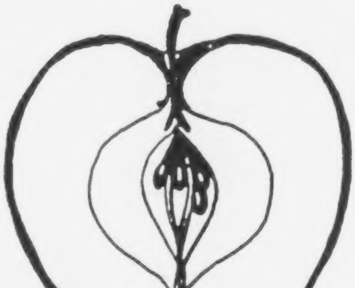


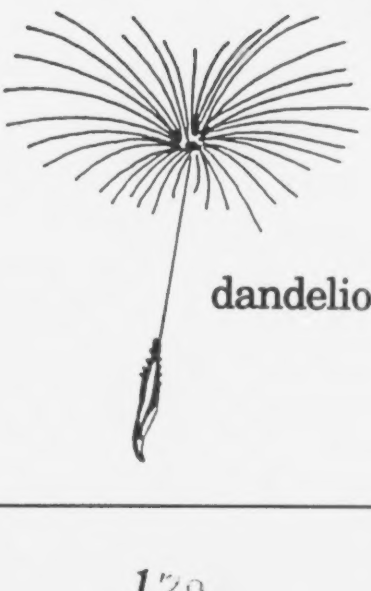
meadow violet



acorn



apple



dandelion

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Biography:

Dr. Charles Stewart Parker:

Botanist

(1882-1950)

Dr. Charles Stewart Parker was a famous botanist. A botanist is a scientist who studies plants and plant life. He discovered 39 species of plants. He conducted research on the diseases that affect cherry trees and this led to the elimination of these diseases in the state of Washington. Dr. Parker was a professor at Pennsylvania State University and at Howard University in Washington, D.C. He was also the head of the Department of Botany at Howard University. Parker directed a botanical expedition to Mexico.

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Discovery Guide:

What Conditions are Best for Seed Growth?

1. Decide upon one kind of seed to use for all experiments. Corn or beans germinate quickly and are very satisfactory for this study. You will experiment with four different factors: temperature, amount of light, water, and oxygen.

2. Select five dishes. You need one for each factor, and one to act as a control. In the bottom of each dish, place a blotter or layer of cotton and put a dozen seeds on top of this.

3. Number the dishes 1 through 5. Dish number 1 is your control. It should be kept under conditions offering all four factors: normal room temperature, natural sunlight, adequate water, and oxygen.

4. Dishes 2 through 5 are the experimental dishes. Each one will be kept under conditions offering only three out of the four factors, as listed below:
    - **Temperature:** Place dish number 2 in a pan of ice water, yet set the pan where the seeds can receive natural sunlight, water and oxygen.
    - **Light:** Place dish number 3 in a dark cupboard, yet where the temperature is controlled, and the seeds can receive water and oxygen.
    - **Water:** Give dish number 4 no water, yet place it where the temperature is controlled, and the seeds can receive natural sunlight and oxygen.
    - **Oxygen:** Place a sheet of glass over dish number 5, yet set the dish where the temperature is controlled, and the seeds can receive natural sunlight and water.

5. What happened to the seeds in each dish? Do seeds grow better in warm or cold places, in light or dark, with or without moisture and air?

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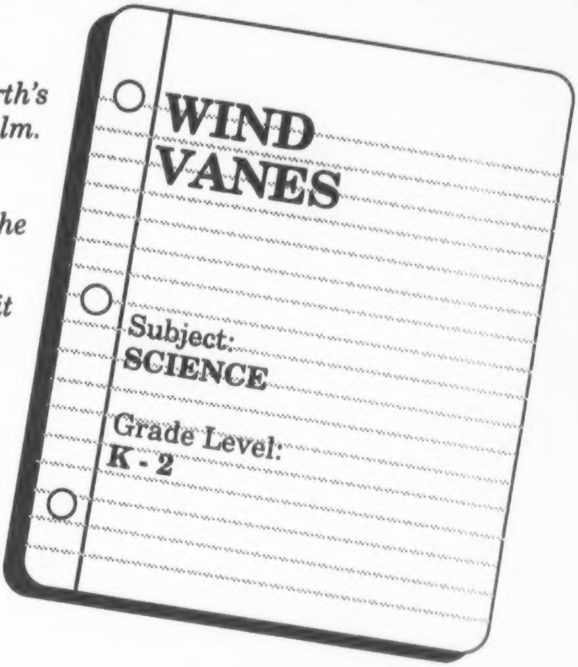

WIND VANES

Subject:
SCIENCE

Grade Level:
K - 2

Concept Statements

- *Wind is air moving horizontally to the earth's surface. Vertically moving air is called a calm.*
- *Wind affects the weather.*
- *Wind vanes show the direction from which the wind is blowing.*
- *Wind is named for the direction from which it blows.*

Instructional Objectives

The student will:

- Describe wind as moving air.
- Construct a wind vane.
- Name wind for the direction from which it blows.

African American Role Model

The student will:

- Identify weather forecaster Spencer Christian, who serves his community by reporting the weather.

Affective Factors

- *Eliminating Stereotyping* - Students learn that Blacks can be television weather reporters.
- *Perceived Utility* - Students learn that knowledge of wind is important in understanding weather.
- *Significant Others* - Teachers can help students to identify with positive Black men and women role models in the media.

Materials

Dowel rod
Fan
Hammer
Nails
Oil
Wood (one inch width)

Vocabulary

Air
Meteorologist
Water
Weather forecaster
Weather instrument
Wind
Wind vane

Teaching Procedures - Lesson 1

- Ask students to describe how they know when there is wind. The following should be included: felt on face; flags flap; feels chilly; trees and other plants sway; smoke drifts; paper objects move; dust blows; and kites fly.

  The students should understand that although we cannot see wind, we can see and feel its effects.

- Lead a discussion about wind and its effects on our weather. Students should understand that wind is moving air and that changing weather and storms are associated with wind.

- Remind the students that wind comes from different directions and discuss why it is important to know from what direction it blows. Ask if anyone knows how scientists who study weather can tell from where the wind blows. Students should understand that a wind vane is a weather instrument that points into the wind.

- Tell the students that they will make a wind vane. Show them a completed wind vane, and point out the following features of a good wind vane:

  - The tail is larger than the point.
  - It turns easily.
  - The weight is evenly balanced.

  Read and/or distribute the discovery guide, ***How to Construct a Wind Vane*** (page S-10). Provide each student with the necessary materials. Allow the students to try their wind vanes outdoors. If it is not a windy day, small groups of students can hold their wind vanes in front of a large fan. Collect the wind vanes for use in the next science lesson.

Teaching Procedures - Lesson 2

- Review concepts related to wind and wind vanes. Show several wind vanes that were made during the last class, and identify features that make them work well.

- Conduct a discussion about meteorologists, what they do, and how they help us. If video equipment is available, show a videotape of a local television weather reporter. Discuss their job and the skills they need. Discuss what students have to know and do to become weather reporters and meteorologists. Students should understand that there are many different kinds of people who are meteorologists and weather forecasters including Blacks, Hispanics, women, and other minorities. If there are local Black weather forecasters, identify them and show videotapes of their reports. Read and distribute biography, ***Spencer Christian: Weather Forecaster*** (page S-11). Show Spencer Christian's photograph (page S-12).

- After the students have viewed a television weather forecast, ask them what kinds of information are given about the wind (wind speed, direction). Ask the students what is meant by North wind or East wind. Students should understand that winds are named for the direction from which they blow.

- Review direction with respect to the classroom and school grounds. Allow the students to use their wind vanes to identify and name wind direction.

Follow-up Activities

- Contact a local radio, or television station, and request that a weather forecaster or meteorologist visit the school and talk to the students. Suggest they describe skills needed in their job.
- Encourage students to construct a booklet illustrating different weather conditions. Pictures from magazines or newspapers could be cut out and pasted to pages. Have students dictate weather captions to be recorded under their pictures.
- Discuss the effects of weather on the different types of topography (mountains, deserts, forests).
- Have students view a regularly scheduled Black weather forecaster: Spencer Christian, ABC-TV, "Good Morning America," 7:00-9:00 a.m. or Mark McKuen, CBS-TV, "This Morning on CBS," 7:00-9:00 a.m.

Resources

Branley, Franklyn. *Hurricane Watch: Let's Read and Find Out.* New York: 1985.

The Challenge of Meteorology. Boston: American Meteorological Society, 1985.

Davis, Marianna, (Ed.) *Contributions of Black Women in America.* Columbia, SC: Kenday Press, Inc., 1987.

Dorros, Arthur. *Feel the Wind.* New York: Crowell, 1989.

Lampton, Christopher. *Meteorology, An Introduction.* New York: Franklin Watts, 1981.

McVey, Vicki. *The Sierra Club Book of Weatherwisdom.* San Francisco: Sierra Club Books, 1991.

Steele, Phillip. *Wind.* New York: Franklin Watts, 1991.

Taylor, Barbara. *Wind and Weather.* New York: Franklin Watts, 1991.

Wind to Flight. New York: Glouster Press, 1989.

Discovery Guide:

How to Construct a Wind Vane

1. Saw an arrow out of a piece of wood one inch thick. Hammer a long spike from the top edge center through to the underside. The nail should protrude two inches.
2. Drill a hole in one end of a thick dowel rod. Fasten the dowel upright to a wooden base or it may be driven directly into the ground near your weather station.
3. Oil the hole in the dowel before setting the arrow onto the stand. This will reduce friction as the wind vane turns with the breeze.

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Biography:

Spencer Christian:

Weather Forecaster

(1947-   )

Spencer Christian is the weather forecaster for ABC's "Good Morning America." Have you ever seen him on TV? He was born in Charles City, Virginia, and before becoming a weather forecaster, Spencer Christian was a news reporter in Virginia. Studying hard in school helped him get jobs as a reporter and a weather forecaster. He studied both English and journalism at Hampton University in Virginia. It is necessary to speak and write English well in order to get a job as a weather forecaster.

When Mr. Christian is not on TV, he enjoys helping others. In 1988, he was ABC's spokesperson for "Readasaurus Literacy," a program designed to get kids interested in reading. He wants all children to like reading and to stay in school. Spencer Christian also helps children with disabilities by helping the March of Dimes and the Special Olympics. He does a lot to raise money for the United Negro College Fund, an organization that raises money for African American students. Spencer Christian has received many awards for helping other people and strongly believes in being a role model.

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Spencer Christian

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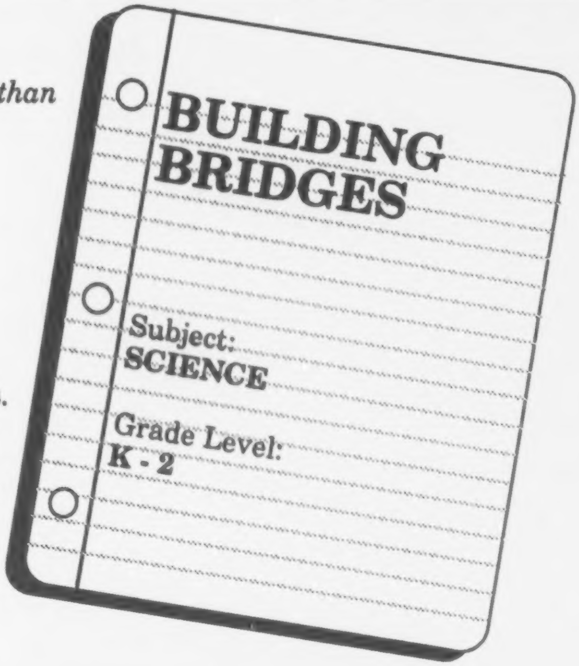

BUILDING BRIDGES

Subject: SCIENCE

Grade Level: K - 2

Concept Statements

- *Long bridges need to have stronger supports than short bridges.*
- *An object's shape affects its strength.*

Instructional Objectives

The student will:

- Describe properties of bridges.
- Construct bridges to span various distances.
- Identify steps in building an actual bridge.
- Describe an engineer as a scientist who helps build things.

African American Role Models

The student will:

- Identify Archie Alexander as a design and construction engineer.
- Identify Norma Curby as a structural design engineer.

Affective Factors

- *Persistence* - Students learn about successful scientists who encountered many obstacles while pursuing a scientific career.
- *Perceived Utility* - Students learn the importance of bridges in everyday life.

Materials

Books, blocks, or scrap wood
Construction paper
Glue
Pre-cut paper strips (10cm, 30cm, 1m)
Rulers
Scissors
Tape

Vocabulary

Bridge
Construction
Design
Engineer
Obstacle
Support
Travel
Weight

Teaching Procedures - Lesson 1

- Conduct a discussion about bridges and why they are necessary. Students should understand that bridges allow travelers to cross obstacles; they can be different types and shapes; they are constructed of different materials; and they are different in the amount of weight they can support. If possible, identify the types of bridges in the surrounding area.

- Show the students 2 books to serve as docks lying flat on a table with an opening between them of about 10 cm. Ask the students how they might build a bridge across the docks. After several suggestions, move the books so that the distance between is about 1 meter. Ask students how a bridge might be made this time and to compare the design and materials that would be needed.
- Distribute books, rulers, scissors, glue, tape, and rolls of construction paper. In small groups ask students to build three different bridges that will span 10 cm, 30 cm, and 1 meter, respectively. Encourage students to make the bridges free standing, as light and as simple as possible, and strong enough to resist sagging. If any students have difficulty, show them how to add strength by adding supports. Supports might include rolled tubes of paper taped under the bridges and folded stripes of paper taped in triangle and rectangle spaces and attached above, below, or along the edges of the bridges. Building bridges will likely require more than one class period.
- When the bridges are finished, allow each student to describe his or her bridge designs and any important features. Students should compare the amount of paper used, the shapes of any supports, and the amounts of sagging. Students should understand that long bridges must be strong to avoid sagging and that triangle and rectangle supports add strength to the bridges.
- Ask the students to describe what they were doing when they made the bridges and introduce the career of engineer. Discuss what students need to know and do to become an engineer. Discuss the applicability of mathematics and science to engineering and everyday life.
- Collect the bridges for use in further discussions and the follow-up activities.

Teaching Procedures - Lesson 2

- Conduct a discussion in which students describe what might be involved in building an actual bridge. Included might be:
    - Designing plans
    - Determining materials needed
    - Determining the order of tasks
    - Checking progress
    - Estimating costs
- Help the students describe these tasks as things done by an engineer. Students should understand that engineers are experts in designing and building.
- Read and distribute the biography, ***Archie Alexander: Engineer*** (page S-16).
- Read and distribute the biography, ***Norma Curby: Engineer*** (page S-17).

Follow-up Activities

- Have students test the strength of their own bridges by carefully placing identical objects on each bridge to see which can support the most weight.
- Have the students construct a model building using a variety of art materials. Encourage students to describe what the building could be used for.

Resources

Adkins, J. *How a House Happens.* New York: Walker and Company, 1972.

Ardley, Neil. *Bridges.* Ada, OK: Garrett Educational Corp., 1990.

Elementary Science Study: Teacher's Guide for Structures. New York: Webster Division, McGraw-Hill Book Company, 1970.

Gibbons, G. *Tunnels.* New York: Holiday House, 1984.

Isaacson, Philip. *Round Buildings, Square Buildings & Buildings that Wiggle Like a Fish.* New York: Knopf, distributed by Random House, 1988.

Lewis, A. *Super Structures.* New York: Viking Press, 1980.

O'Connor, Vincent. *Mathematics in Buildings.* Milwaukee: Raintree Children's Books, 1978.

Ramos, G. *Careers in Construction.* Minneapolis: Lerner Publications, 1975.

Robbins, Ken. *Bridges.* New York: Dial Books, 1991.

Biography:

Archie Alexander:

Engineer

(1888-1958)

Archie Alexander was a civil engineer. He built bridges for the Rock Island & Pacific Railroad in Chicago, Illinois, as well as the Tidal Basin Bridge and the Whitehurst Freeway in Washington, D.C. He also built airfields, tunnels, power plants, and sewage disposal plants. Although he was discouraged from becoming an engineer because he was an African American, he never gave up. Archie graduated from high school and then worked several years to earn money to attend college. At the University of Iowa, Archie studied and worked long hours, but he also found time to join a fraternity, as well as play football. He graduated from college with a Bachelor's degree in civil engineering.

Archie Alexander organized an engineering firm, Alexander and Repass, with one of his former classmates. He directed this successful firm for over forty years. President Eisenhower appointed Mr. Alexander to be the Governor of the United States Virgin Islands. He was also the national president of Kappa Alpha Psi fraternity, the president of the Des Moines Inter-racial Commission, and a trustee for both Howard University and the Tuskegee Institute.

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Biography:

Norma Curby:

Engineer

(1952-   )

At the age of twenty-five, Norma Curby became one of the youngest Black structural design engineers. A structural engineer designs the beams, bracings, columns, foundations, and frameworks that support buildings. As a structural design engineer, Curby has knowledge of computers, drawings, and models.

Norma was born in St. Louis, Missouri, in 1952. In the seventh grade, she became interested in engineering after reading a newspaper article about a woman who designed a bridge in California. Young Norma read everything she could on engineering. However, she was discouraged from pursuing a career in engineering because at the time few women were engineers.

Norma Curby believed in herself, and her mother, Mabel Humphries, also encouraged and believed in Norma. Curby received a scholarship from the University of Missouri at Rolla. In 1972, she graduated with a civil engineering degree after only three and a half years. Most college students graduate with a degree after four years. Curby began working at the Monsanto Company of St. Louis in 1973. She was only one of six women engineers at this company. Norma Curby, in a non-traditional female role, is both an inspiration and a role model.

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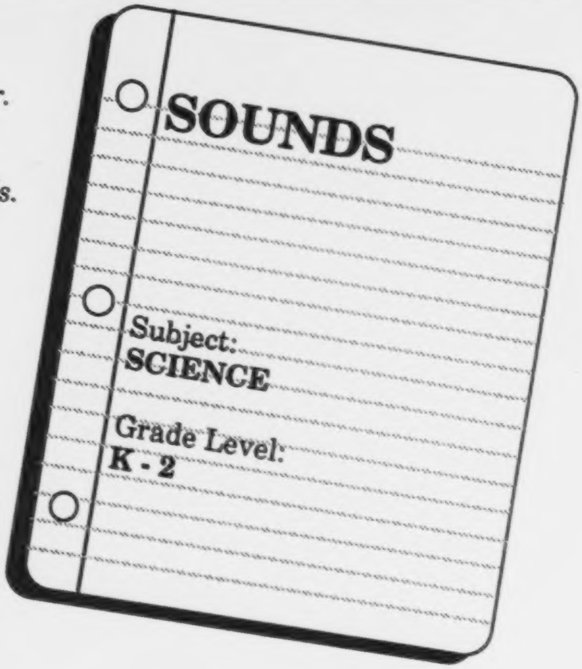

Concept Statements

- *Sounds are received through the human ear.*
- *Sounds are produced by vibrations.*
- *Sounds are made using a variety of methods.*
- *Moving air is one way sound travels.*

Instructional Objectives

The student will:

- Identify blowing, plucking, rubbing, shaking, and striking as ways of making sounds.
- Demonstrate different ways of making sounds.
- Describe voice sounds as blowing sounds.

African American Role Models

The student will:

- Identify Ella Fitzgerald and Bobby McFerrin as two entertainers who use their voices to create new sounds.

Affective Factors

- *Attitudes* - Students will enjoy exploring sounds and making sound effects.
- *Perceived Utility* - Students will understand that some noises are unwanted or uncontrolled sounds which can interfere with learning.

Materials

Blackboard or chart paper
Large pails or containers
Model or picture of vocal cords
Recordings of Ella Fitzgerald and Bobby McFerrin
Tablespoons
Teaspoons
Variety of materials to make sounds (rubber bands, containers with lids, paper clips, wooden blocks, silverware, rocks, rulers, whistles)
Water
Wire or metal (75 feet long)

Vocabulary

- Blowing
- Music
- Noise
- Plucking
- Rubbing
- Shaking
- Sound
- Sound effects
- Striking
- Vibrations
- Waves

Teaching Procedures - Lesson 1

- Conduct a discussion in which students list sounds that can be heard in the proximity of the classroom. This list might be recorded on a blackboard or chart. If possible, try to identify the location in which each sound might be found (bird chirping – forest, car horn – road, hammering – construction site, air humming – air conditioner).
- For each of the sounds listed, ask the students to describe how each is made. Students should understand that sounds can be produced and classified by the following methods:

  - Blowing
  - Plucking
  - Rubbing
  - Shaking
  - Striking

  Help the students describe additional examples, if needed, and understand that objects vibrate or move when sounds are made, moving the air like ripples or waves on a pond.
- Divide the students into small groups and provide them with a variety of materials that can be used to make sounds. Suggest that they construct an instrument or device to make a sound using each of the methods listed. After the students have completed their projects, allow them to describe and demonstrate how they work. At the end of the demonstrations, the class should identify the method used.

Teaching Procedures - Lesson 2

- Review concepts related to methods of making sounds. Encourage the students to describe examples of each, including instruments and devices constructed during the previous lesson.
- Ask the students to consider the human voice and how it should be classified (blowing, plucking, rubbing, shaking, striking). Following a discussion in which students express their opinions and reasons, suggest they try the following activities:

  - Feel your throat as you talk or sing.
  - Close your mouth, hold your nose and hum.
  - Place a folded tissue between your lips and hum.
  - Hold a tissue so that it hangs down covering your mouth and talk.

  Ask the students to describe what happens: (a) feeling vibrations with fingers; (b) feeling little vibrations when air cannot move past the vocal cords; and (c) tickling sensation on the lips caused by the vibrating tissue. They should notice their cheeks filling up with air when they hum and the tissue moving while they talk. Help the students use these observations to conclude that voice sounds are vibrations made by blowing.

- Help the students understand that the human voice can be used to make a variety of sounds. Describe Ella Fitzgerald and Bobby McFerrin as entertainers who have developed their voices so they sound like other instruments. Play a recording of Bobby McFerrin, such as "Don't Worry, Be Happy," in which he imitates instrument sounds. Play recordings of Ella Fitzgerald using *scatting*. Ask the students to describe the sounds and the method usually used to make them. They should understand that like all voice sounds, these sounds are made by exhaling air past the vocal cords. Read and distribute biographies and photographs, ***Ella Fitzgerald: Singer*** (pages S-22 through S-23) and ***Bobby McFerrin: Singer*** (pages S-24 through S-25).

Follow-up Activities

- Construct a variety of musical instruments and use them to play a song. If possible, try to include as many methods of producing sounds as possible.
- Make a tape recording of a story that includes sound effects. The story can be an original or one taken from a textbook or library book.
- Obtain the record "Sounds of the City" or another sound effects record. Have students identify the sounds included.
- Obtain records of the Mills Brothers. All of the "instrument sounds" are those of the human voice.
- Play records of bird calls and wolf calls.
- Have students conduct some of the activities described in discovery guide, ***Finding Out About Sound*** (page S-26).

Resources

Broeker, R. *Sound Experiments.* Chicago: Children's Press, 1983.

Chan, Janis Fisher. *Sound.* Hayward, CA: Janus Book Publishers, 1982.

Kliment, Bud. *Ella Fitzgerald.* New York: Chelsea House Publishers, 1988.

Kranz, Rachel. *The Biographical Dictionary of Black Americans.* New York: Facts on File, 1990.

Lanker, Brian. *I Dream a World: Portraits of Black Women Who Changed America.* New York: Stewart, Tabori & Chang, 1989.

Pettigrew, Mark. *Music and Sound.* New York: Gloucester Press, 1987.

Ploski, Harry A. and James Williams, (Eds.) *The Negro Almanac: A Reference Work on the African American.* (Fifth Edition) Detroit: Gale Research, Inc., 1989.

Biography:

Ella Fitzgerald:

Singer

(1918-   )

Ella Fitzgerald is a famous jazz singer. She was born in Newport News, Virginia, on April 25, 1918, and was orphaned at an early age. Ella moved to New York City and attended school at an orphanage in Yonkers, New York. When she was only 15 years old, she was discovered singing in an amateur contest in the famous Apollo Theatre in Harlem, New York. She was supposed to dance, but she was too nervous, so she started to sing. Her style of singing is called *scatting* which is a very difficult way to sing. Her most famous song is based on a children's nursery rhyme written in 1938 called "A-Tisket-A-Tasket." Some of her other songs include "I'm Thrilled," "Into Each Life Some Rain Must Fall," and "Oh! But I Do." Ella Fitzgerald tries to picture something in every song she sings because each song is a story to her. She has won 8 Grammy Awards for her singing, numerous popularity awards, and in 1968, she was named the Number One Female Singer. She also excels in cooking and photography, but she is best known for her singing. Ella Fitzgerald in considered one of the greatest singers and composers in the world.

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Ella Fitzgerald

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Biography:

Bobby McFerrin:

Singer

(1950-)

Bobby McFerrin is a well known entertainer. Both his mother and father were classical singers. Bobby McFerrin began studying music at the age of 6. Bobby played the piano, as well as several other instruments. When the McFerrin family relocated to Los Angeles, Bobby led a jazz quartet in his high school. He also attended California State University.

After completing his education, Bobby McFerrin went on the road traveling with a series of bands, dance troops, and lounge acts. In 1977, he decided to focus on being a singer and his career took off. Bobby McFerrin met Bill Cosby, who was so impressed with McFerrin's voice that he arranged several performances for McFerrin at the Hollywood Bowl in California. Bobby McFerrin recorded songs such as "Common Threads" and "Don't Worry, Be Happy," which were very successful.

One thing that makes McFerrin's performance so successful is his ability to imitate a variety of sounds with just his voice. Ranging from animals to musical instruments, McFerrin can make his voice sound like the 'real' thing. He has also worked with other musicians, such as Herbie Hancock and Wynton Marsalis, and has conducted the San Francisco Symphony Orchestra. Bobby McFerrin has received 9 Grammy Awards for his work as a musician and a singer.

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Bobby McFerrin

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Discovery Guide:

Finding Out About Sound

Will Sound Travel Through Liquids?

Fill a large pail or other container with water. Hold two rocks down in the water and strike them together forcibly. Did you hear a sound?

Will Sound Pass Through Solid Matter?

Put your ear close to the end of a wooden table. Ask another person to scratch the wood at the opposite end with a fingernail or other sharp object. Can you hear a sound through the wood?

Does the Size of an Object Affect the Pitch of Sound?

Use a teaspoon and a tablespoon for this experiment. Strike each one on the same kind of material. Which one makes a higher sound?

Do Sounds Go in All Directions?

Stand outside in a busy place and listen for all kinds of sounds. Are sounds coming up to your ears from the ground? Can you hear any sounds coming out of the sky down to you? What noises are to the sides, the back, and the front of you? Can you hear sounds from objects you can't see, such as the fire engine coming down another street? Does this prove that sound travels around corners?

Does the Density of a Material Affect the Speed of Sound?

This experiment requires a length of metal at least 75 feet long. An iron fence will have continuous rods running through it or a roll of wire may be stretched the length of your backyard or school ground. Stand at one end with a partner at the opposite end holding two rocks. Place your ear very close to the wire or rod while your friend strikes the rocks together with the wire trapped between. Listen closely for two sounds – one following immediately after the other. The sound is coming through air as well as through the metal. Do sound waves move faster in a gas or a solid?

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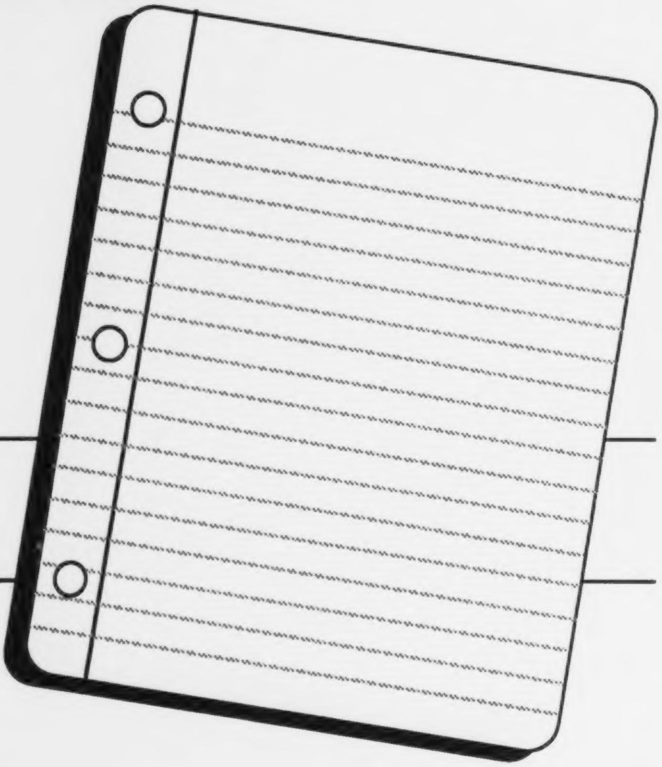
INTRODUCING AFRICAN AMERICAN ROLE MODELS INTO SCIENCE LESSON PLANS



Grades 3 - 4

WHAT IS FOUND IN SOIL?

Subject:
SCIENCE

Grade Level:
3 - 4

Concept Statements

- *Plants obtain minerals, nutrients, and moisture from soil.*
- *Soil contains a variety of organic (humus) and inorganic materials.*
- *Most plants grow well in soil rich with humus.*

Instructional Objectives

The student will:

- List the needs of plants.
- Group soil particles found in humus.
- Identify humus as having many different parts.
- Identify a geologist as a scientist who studies the earth.
- Identify an agronomist as a specialized geologist.

African American Role Model

The student will:

- Identify John Lawrence as an agronomist who studied ways of improving crops.

Affective Factors

- *Perceived Utility* - Students learn why it is important to study soil and how it affects the growth of plants used for food.
- *Stereotyping* - Teachers can help students understand the long tradition of African American participation in a wide variety of mathematic and scientific fields.

Materials

Humus or potting soil
Magnifying glasses
Trays

Vocabulary

Agronomist
Carbon dioxide
Humus
Light

Minerals
Nutrients
Oxygen
Soil

Teaching Procedures - Lesson 1

- Conduct a discussion in which students describe the needs of plants and where those needs are obtained. Included might be light (sun), carbon dioxide (air), oxygen (air), water (rain, soil), minerals and nutrients (soil). The students should understand that each of these are necessary for plants to grow.
- Tell the students that they will be studying soil and that scientists who study soil are agronomists. Ask the students to describe different kinds of soil and the kinds of plants that might grow in each type. It might be helpful to list these on a chart, black board, or transparency. Include color, texture, and moisture. Ask the students what kind of things might be found in soil.
- Provide each student with a tray of humus or potting soil and a magnifying glass. This type of soil is used because it contains a large variety of materials. Suggest that the students identify and separate what they find into groups. The following are groups that might be used:

  insects
  large dirt particles
  leaves
  pebbles
  sand
  seeds
  small dirt particles
  sticks

- Have students draw what they see. Conduct a discussion about the kinds of things they found and why plants grow well in this type of soil. The students should describe potting soil and humus as containing a wide variety of objects, and that it is this variety of soil that provides plants with the minerals and nutrients they need.

Teaching Procedures - Lesson 2

- Review concepts related to needs of plants and the composition of humus and potting soil. Remind the students of how they studied soil like an agronomist. Identify what might be involved in that career and discuss why agronomists are important. (An agronomist studies soil, its make-up, how to care for soil, and ways of improving farm crops.) Discuss the applicability of science to agronomy and everyday life. Discuss with students what they need to know and do to become agronomists.
- Conduct a discussion about why agronomists are important. Include discussion about food supply and improving farm production. Students should understand that farming is more than just planting and harvesting. Farmers depend on scientists to improve their crops and production. The care and preparation of soil is important to the farmer.
- Distribute the biography, ***John Lawrence: Agronomist*** (page S-30).

Follow-up Activities

- Contact your local county extension agent and submit a school soil sample for testing. When the results are received, discuss the recommendations. It might be possible for the extension agent to visit the school and present information on soil and agronomy.

- Investigate the water holding capacity of different soils (humus, sand, garden soil, subsoil). Remove both ends of frozen juice containers, and cover one end with a cloth. Fill the cans with different types of soil and pour a measured amount of water into each. Compare the amounts of water that run through the containers.

Resources

Catherall, Ed. *Exploring Soil and Rocks.* Austin, TX: Steck-Vaughn, 1991.

Heady, Eleanor B. *The Soil That Feeds Us.* New York: Parents Magazine Press, 1972.

Lambert, Mark. *Farming and the Environment.* New York: Steck-Vaughn, 1991.

Pearce, Querida L. *Quicksand and Other Earthly Wonders.* Englewood Cliffs, NJ: J. Messner, 1989.

Russell, Helen Ross. *Soil: A Field Trip Guide.* Boston: Little, Brown, and Company, 1972.

Silver, Donald. *Earth: The Ever-Changing Planet.* New York: Random House, 1989.

Sutton, Felix. *The How and Why Wonder Book of Our Earth.* Chicago: J. G. Ferguson Publishing, 1987.

Biography:

John Lawrence:

Agronomist

(1944-)

John Lawrence is an agronomist with the United States Department of Agriculture's Soil Conservation Service. An agronomist is a person who studies soil and methods to improve crops. Lawrence gives advice and suggestions on what crops will grow best in different soils. He also conducts research on agricultural problems caused by soil and water erosion. John Lawrence studies soil in the Unites States, as well as in other nations around the world. His work is similar to George Washington Carver's work of 100 years ago.

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MODEL FIRE EXTINGUISHER

Subject:
SCIENCE

Grade Level:
3 - 4

Concept Statements

- *Vinegar (acid) and baking soda (base) react chemically to produce carbon dioxide.*
- *Carbon dioxide does not support combustion.*

Instructional Objectives

The student will:

- Describe a vinegar and baking soda mixture as producing carbon dioxide bubbles.
- Construct a vinegar and baking soda fire extinguisher.
- Demonstrate that carbon dioxide does not support fire.

African American Role Models

The student will:

- Identify Thomas J. Martin as a man who invented the fire extinguisher.
- Identify Lyda Newman, an inventor, as one of the first women to receive a patent for an invention.

Affective Factors

- *Eliminating Stereotyping* - Students recognize that African Americans have invented many useful items.
- *Perceived Utility* - Students recognize that many inventions are useful and applicable to everyday life.
- *Persistence* - Discuss why the ability to persist is important when developing inventions.

Materials

Aluminum foil
Baking soda
Clay
Cookie Sheet
Empty soda/pop bottle
Matches
Measuring spoons
Medicine jar caps with holes
Medicine jars
Paper
Safety goggles
Straw
String
Tissue paper
Vinegar

Vocabulary

- Acid
- Baking soda
- Base
- Carbon dioxide
- Chemical reaction
- Fire extinguisher
- Invention
- Inventor
- Oxygen
- Safety goggles
- Vinegar

Teaching Procedures - Lesson 1

- Demonstrate a vinegar and baking soda reaction and how it can be used to extinguish a fire.
  - Sprinkle 1/2 teaspoon of baking soda in the bottom of an aluminum foil dish.
  - Place a wad of paper in the middle of the foil dish.
  - Light the paper **(SAFETY GOGGLES SHOULD BE USED)**.
  - Pour 1 tablespoon of vinegar into the bottom of the dish.

  The students should observe that the chemical reaction between vinegar and baking soda produces bubbles. Point out that these bubbles are composed of carbon dioxide. Carbon dioxide does not support fire, so the fire is extinguished.

- Conduct a discussion in which the students describe the possible uses of this reaction. They should identify these chemicals as useful for making fire extinguishers. Suggest that the students develop such a device. Before they begin, discuss the following requirements:
  - The materials must be placed in a plastic medicine jar.
  - The chemical reaction will not take place until needed.
  - The fire extinguisher will be operated by shaking or turning it upside down.

- Divide the students into small groups and provide them with the listed materials. Allow the students to investigate a variety of arrangements and encourage trial tests without fire. If, after sufficient investigation, some students are having difficulty, provide them with the discovery guide, ***How to Construct a Model Fire Extinguisher*** (page S-34).

- Allow each group to demonstrate their fire extinguisher under the direction of an adult. **EVERYONE MUST USE GOGGLES.** The groups should describe how their extinguisher was made and any difficulties that they encountered.

- Introduce the terms inventor and invention. Conduct a discussion in which students describe their role as an inventor and their product as an invention.

Teaching Procedures - Lesson 2

- Review the concepts of inventor and invention. Ask students to suggest what might be necessary for an invention to be successful. Included might be the following:
  - New
  - Needed
  - Works better than others that are available
  - Can be made cheaper than others that are available

- Point out that there are many inventors, including minorities and females. As an example, distribute the biographies, ***Two Inventors: Thomas J. Martin and Lyda D. Newman*** (page S-35). Discuss the handout ***Thomas J. Martin's Patent Diagram of the Fire Extinguisher*** (page S-36). Martin developed the fire extinguisher in 1872. Remind the students of their fire extinguisher models and what might be needed to successfully market them. They might also discuss the merits of the baking soda and vinegar fire extinguisher. Discuss the handout, ***Lyda D. Newman's Patent Diagram of the Hair Brush*** (page S-37). Discuss other household inventions that are important to personal hygiene. See the handout, ***Famous Black Inventors and Their Inventions*** (pages S-38 through S-39), for other inventions by Black men and women.

Follow-up Activities

- Suggest the students examine their needs at school, at home, or at play and try to identify the need for a new invention. Small groups of students might be interested in trying to develop this idea into a working prototype. Hold an invention exhibition where students can demonstrate and display their work.
- Distribute to students the handout, ***Famous Black Inventors and Their Inventions*** (pages S-38 through S-39). Ask students to select one invention and draw a picture of what it might have looked like. Handout, ***J.A. Burrs' Patent Diagram of the Lawn Mower*** (page S-40), is an example.

Resources

Carwell, Hattie. *Blacks in Science: Astrophysicist to Zoologist.* Smithtown, NY: Exposition Press, 1977.

Green, Richard L. and Frederick L. McKissack, (Eds.) *Historic Black Firsts.* Chicago: Empak Publishing Company, 1990.

Haber, Louis. *Black Pioneers of Science and Invention.* New York: Harcourt Brace Jonanovich Publishers, 1970.

Ives, Patricia Carter. *Creativity and Inventions: The Genius of Afro-Americans and Women in the United States and Their Patents.* Arlington, VA: Research Unlimited, 1987.

Ploski, Harry A. and James Williams, (Eds.) *The Negro Almanac: A Reference Work on the African American.* (Fifth Edition) Detroit: Gale Research Inc., 1989.

Sweet, Dovie Davis. *Red Light, Green Light: The Life of Garrett Morgan and His Invention of the Stop Light.* Smithtown, NY: Exposition Press, 1978.

U.S. Patent Search Room. 2021 Jefferson Davis Highway, Arlington, VA 22202.

Wayden, Robert C. *Eight Black American Inventors.* Reading, MA: Addison-Wesley, 1972.

Discovery Guide:

How to Construct a Model Fire Extinguisher

1. Form the clay around the end of the straw into a plug which can be used to cap the bottle. Fill the pop bottle half full of vinegar. Drop a teaspoon of baking soda into the bottle and immediately cap it with the clay-straw plug.

2. Have a small paper fire burning on a cookie sheet. Tilt the bottle, aiming the straw at the flames. What happened to the fire?

3. When vinegar and soda are combined, a chemical change releases carbon dioxide. This gas is heavier than air, does not support combustion, and will smother the blaze.

Reprinted with permission. *The Young People's Science Encyclopedia.* Chicago: Childrens Press Inc., 1970.

Biographies:
Two Inventors

Thomas J. Martin
(18– - 19–)

Thomas J. Martin invented the fire extinguisher. He submitted his patent to the United States Patent Office on March 26, 1872. The purpose of this invention was to extinguish fires in houses, factories, mills, etc. Martin's invention was also used for washing buildings, pavements, and streets.

Lyda D. Newman
(18– - 19–)

Lyda D. Newman was one of the first Black women to receive a United States patent. She received her patent for a special hairbrush on November 15, 1898. This hairbrush permitted easy cleaning because it had a detachable unit which held the brush bristles.

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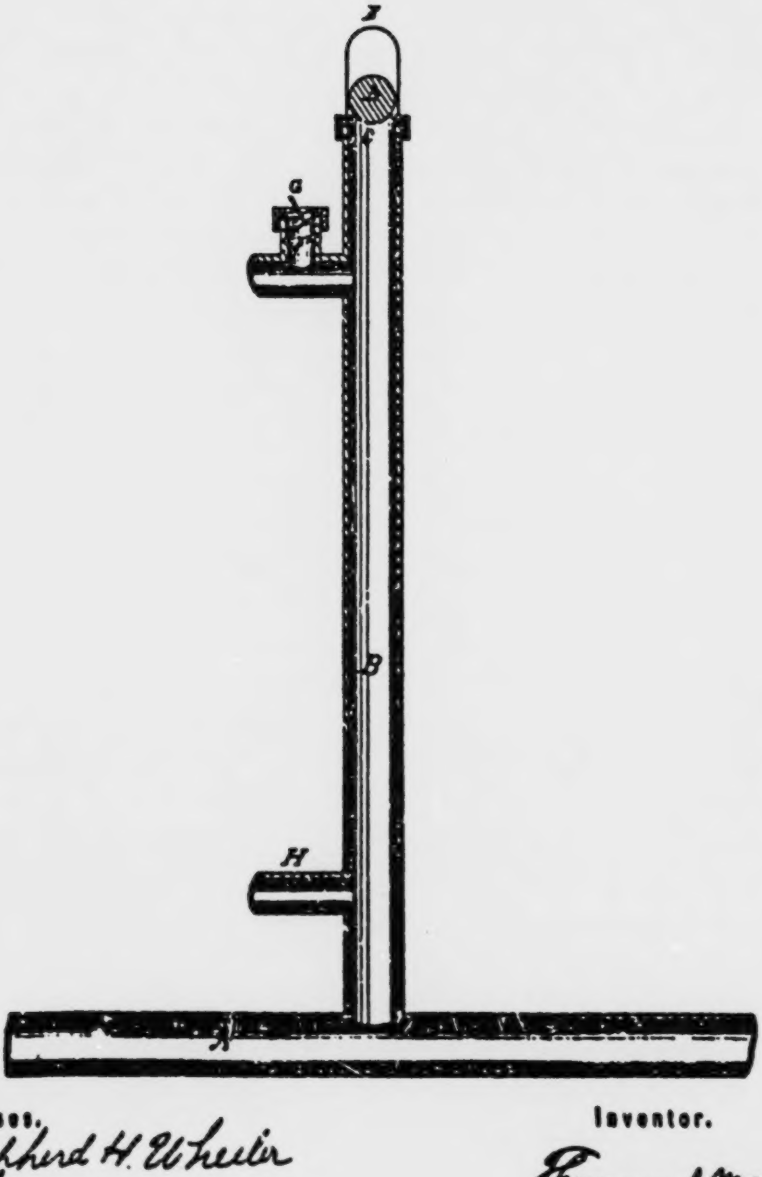
Thomas J. Martin's Patent Diagram of the Fire Extinguisher

THOMAS J. MARTIN.

Fire Extinguisher.

No. 125,063. **Patented March 26, 1872.**



Witnesses.

Shepherd H. Wheeler

Inventor.

Thomas J Martin

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Lyda D. Newman's Patent Diagram of the Hair Brush

No. 614,335. Patented Nov. 15, 1898.

L. D. NEWMAN.

BRUSH.

(Application filed July 11, 1898.)

(No Model.)

Fig. 1.

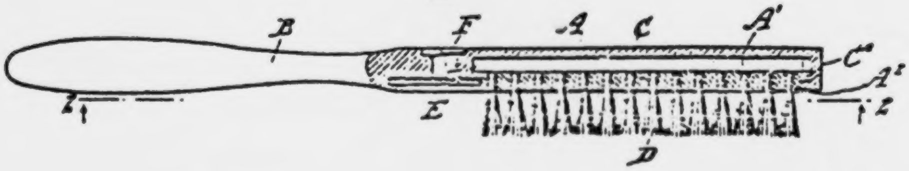


Fig. 2

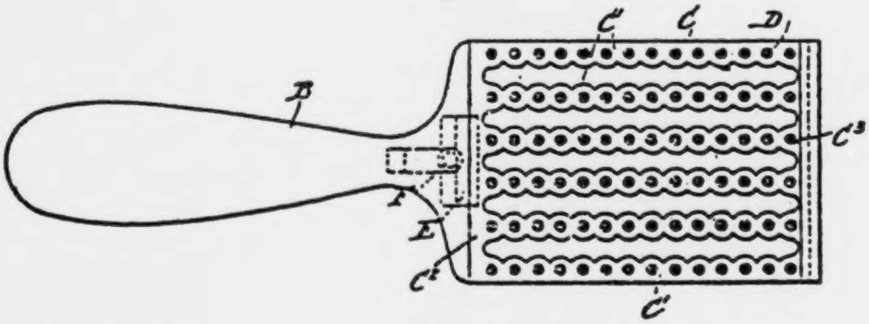
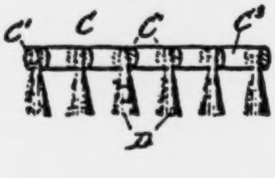


Fig. 3.



WITNESSES:

Edward Thorpe

INVENTOR

Lyda D. Newman

BY Munn & Co

ATTORNEYS.

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Handout:

Famous Black Inventors and Their Inventions

Inventor	*Invention*	*Patent No.*	*Date*
Alexander P. Ashbourne	biscuit cutter	170,460	1875
William Barry	postmarking machine	585,074	1897
L. C. Bailery	folding bed	629,286	1899
Andrew Beard	rotary engine	478,271	1892
Charles R. Beckley	folding chair	3,856,345	1974
Landrow Bell	locomotive smoke stack	115,153	1871
Alexander Benjamin	scouring pads	3,039,125	1962
Mariam E. Benjamin	gong & signal chair	386,289	1888
Albert B. Blackburn	railway signal	376,362	1888
Sarah Boone	ironing board	473,653	1892
Henrietta Bradberry	torpedo discharge means	2,390,688	1945
C. B. Brooks	street sweeper	556,771	1896
Phi Brooks	disposable syringe	3,802,434	1974
Lincoln F. Brown	bridle bit	484,994	1892
Mary V. B. Brown	home security system	3,482,037	1969
Oscar E. Brown	horseshoe	481,271	1892
J.A. Burr	lawn mower	624,749	1899
L.S. Burridge	typewriting machine	315,386	1895
Richard A. Butler	train alarm	584,540	1897
Benjamin F. Cargill	invalid cot	629,658	1899
George Caruthers	image converter	3,478,216	1969
J. M. Certain	parcel carrier	638,708	1899
David Crosthwait	window thermostat	2,346,560	1944
William D. Davis	riding saddle	568,939	1896
Joseph J. Dickson	player piano	1,028,996	1912
Philip B. Downing	electric switch for railroad	430,118	1890
J. H. Evans	convertible settee & bed	591,095	1897
R.F. Flemings, Jr.	guitar	338,727	1888
Sarah E. Goode	cabinet bed	332,177	1885
George F. Grant	golf tee	638,920	1899
William S. Grant	curtain rod support	565,075	1896
Bessie Griffin	portable trash can support	2,550,554	1951
Lydia Holmes	knockdown wheeled toy	2,529,692	1950
Harry Hopkins	power controller	4,704,570	1987
Benjamin F. Jackson	gas burner	622,482	1899
Issac Johnson	bicycle frame	634,823	1914

Continued on next page

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Inventor	*Invention*	*Patent No.*	*Date*
John A. Johnson	wrench	1,413,121	1922
Payton Johnson	swinging chair	249,530	1881
W. Johnson	egg beater	292,821	1884
Fred M. Jones	removable refrigeration	2,475,841	1949
G. W. Kelley	steamtable	692,691	1897
Lewis Latimer	electric lamp	247,097	1910
A. L. Lewis	window cleaner	483,359	1892
Emanuel Logan, Jr.	door bar latch	3,592,497	1971
J. L. Love	pencil sharpener	594,114	1897
Hugh D. MacDonald	rocket catapult	3,447,767	1969
Thomas J. Martin	fire extinguisher	125,063	1872
J. E. Matzeliger	shoe lasting machine	129,843	1872
Elijah McCoy	lubricator	1,574,983	1926
A. Miles	elevator	371,207	1887
Garrettt A. Morgan	automatic traffic signal	1,475,024	1923
Lyda D. Newman	hair brush	614,335	1898
Alice H. Parker	heating furnace	1,325,905	1919
John F. Pickering	air-ship	643,975	1900
W. B. Purvis	fountain pen	419,065	1890
Lloyd P. Ray	dust pan	587,607	1897
W. H. Richardson	child's carriage	405,599	1889
Alvin L. Rickman	overshoe	598 ,816	1898
Norbert Rillieux	sugar making improvement	48,798	1846
Walter H. Sammons	comb	1,362,823	1920
George T. Sampson	clothes dryer	476,416	1892
R. P. Scott	corn silker	524,223	1894
J. H. Smith	lawn sprinkler	581,785	1897
R. B. Spikes	automatic gear shift	1,889,814	1932
John Standard	oil stove	413,689	1889
John Standard	refrigerator	455,891	1891
Rufus Stoke	exhaust purifier	3,378,241	1968
J. H. Sweetning	cigarette roller	594,501	1897
Madeline M. Turner	fruit press	1,180,959	1916
Wade Washington	corn husking machine	283,173	1883
J. W. West	wagon	108,419	1870
J. T. White	lemon squeezer	572,849	1892
Paul E. Williams	helicopter	3,065,933	1962
Granville T. Woods	steam boiler furnace	299,894	1884
Granville T. Woods	telephone system and apparatus	371,241	1887
James Wormley	life saving apparatus	242,091	1881

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J. A. Burr's Patent Diagram of the Lawn Mower

No. 624,749. Patented May 9, 1899.

J. A. BURR.
LAWN MOWER.
(Application filed Sept. 8, 1898.)

(No Model.)

Fig. 1.

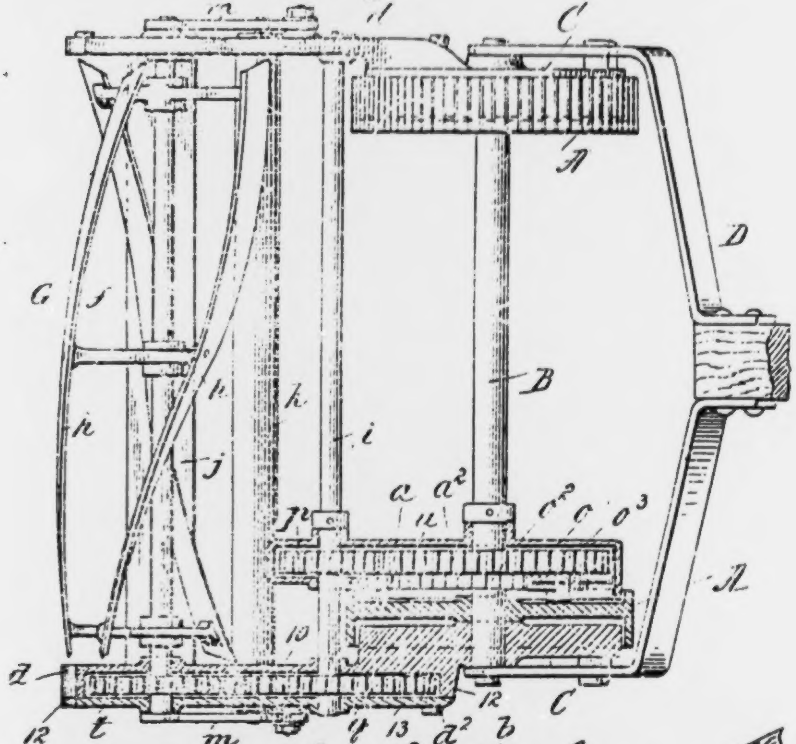
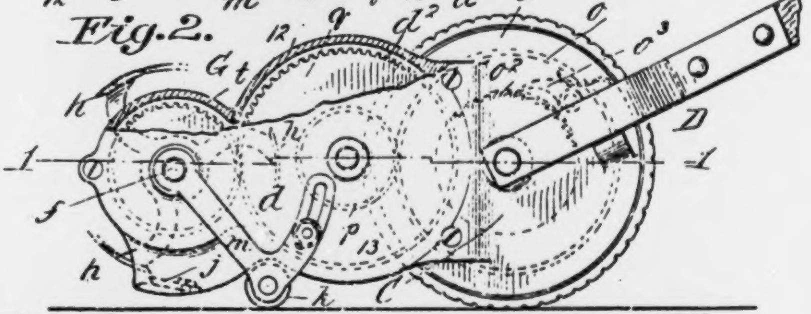


Fig. 2.



Witnesses:

Inventor,
John A. Burr,
by
Attorney.

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LIGHT BULB MODEL

Subject:
SCIENCE

Grade Level:
3 - 4

Concept Statements

- *Electrical energy can be converted into light energy.*
- *A light bulb contains a continuous strand of wire.*

Instructional Objectives

The student will:

- Describe light bulbs as devices for converting electrical energy into light energy.
- Construct a light bulb model.
- Describe light bulbs as devices containing wires that complete a circuit.

African American Role Model

The student will:

- Identify Lewis Latimer as an inventor who improved the light bulb design.

Affective Factors

- *Eliminating Stereotyping* - Students recognize that African Americans have made contributions to the field of electricity.
- *Attitudes* - Students are motivated to investigate electricity and circuits.
- *Perceived Utility* - Students see the everyday applicability of the study of science.

Materials

Bell wire
Bottles or jars
Cork
Dry cells
Fine wire
Ink (or other small) bottle

Vocabulary

Battery
Circuit
Electricity
Energy
Light

Teaching Procedures - Lesson 1

- Conduct a discussion about light bulbs. Describe what they are made of, important parts, the energy used and produced by light bulbs, and the wide variety that can be found. The students should understand the following:

  - A light bulb is a sealed glass jar with wires inside.
  - Light is produced by a thin wire coil inside the bulb.
  - Electricity flows through the bulb and is transformed into light.
  - There are different sizes of bulbs, each giving off different amounts of light and using different amounts of electricity.
  - All light bulbs have the same basic structure.

  Illustrate these concepts by allowing students to examine an unfrosted light bulb and observing what happens when it is lit. This can be done by using a magnifying glass and observing a miniature bulb connected to a battery.

- Tell the students that they are going to build a light bulb model and observe how it makes light. Divide the students into small groups and distribute the discovery guide, ***How to Construct a Light Bulb*** (page S-44), and necessary materials. Allow them to construct their models and connect them to the class lantern battery. They should observe the wire coil glowing inside the jar when the circuit is completed. If the coil burns, the students can reconstruct it. Collect the materials and save one model for further discussion.

- Ask the students to describe their observations and describe the wire coil inside the model light bulb and compare this model to a real bulb.

Teaching Procedures - Lesson 2

- Ask the students to discuss what they learned including how light bulbs are made, the light source within the bulb, and why a bulb burns out. After the discussion, show the students a light bulb in which the glass has been carefully removed. The students should observe the points of contact for the wire ends. Discuss with the students why it is necessary to connect both the metal side and the lower tip to the battery to make it light. Students should understand the following:

  - Light is produced when the wire coil inside the bulb gets hot.
  - Electricity makes the wire coil hot.
  - The ends of the coil inside a bulb are connected to the metal side and bottom tip of the bulb.
  - When the wire coil burns, the circuit is not complete and the bulb no longer works.

- Distribute the biography, ***Lewis Latimer: Scientist*** (page S-45) and the handout, ***Lewis Latimer's Patent Diagram of the Electric Lamp*** (page S-46). Discuss with students what they need to know and do to be an engineer, draftsperson, or inventor. Discuss the applicability of mathematics and science to these careers and to everyday life.

Follow-up Activities

- Provide the students with circuit materials including wires, wire clips, batteries, battery holders, and light bulbs. Encourage them to find many different ways of lighting more than one bulb at the same time. The students should try to make an arrangement so that if one bulb goes out, the others will remain lit.
- Use circuit materials and a buzzer to make a burglar alarm. The wires could be connected to a door so that the buzzer signals when it has been opened.

Resources

Carwell, Hattie. *Blacks in Science: Astrophysicist to Zoologist.* New York: Exposition Press, 1977.

Catherall, Ed. *Exploring Light.* Austin, TX: Steck-Vaughn Library, 1990.

Gardner, Robert. *Light.* Englewood Cliffs, NJ: J. Messner, 1990.

Hayden, Robert C. *Eight Black American Inventors.* Reading, MA: Addison-Wesley, 1972.

Highland, Harold Joseph. *The How and Why Wonder Book of Light and Color.* Chicago: J. G. Ferguson Publishing Company, 1987.

Kranz, Rachel. *The Biographical Dictionary of Black Americans.* New York: Facts on File, 1990.

Turner, Glennette Tilley. *Lewis Howard Latimer.* Morristown, NJ: Silver Burdett Press, 1990.

Discovery Guide:

How to Construct a Light Bulb

1. Push two exposed ends of bell wire through a cork.
2. Wrap fine wire around the end of one wire, then across and around the second wire. This will be the filament in a homemade light bulb.
3. Insert the cork into the mouth of an ink bottle, the filament side in the bottle.
4. Connect the other ends of the wire to a series of dry cells.
5. When the circuit is complete the filament will glow. Eventually the filament burns up since there is oxygen in the bottle. The oxygen has been removed in commercial bulbs.

Reprinted with permission. *The Young People's Science Encyclopedia.* Chicago: Childrens Press Inc., 1970.

Biography:

Lewis Latimer:

Scientist

(1948-1928)

Lewis Latimer was a draftsman, an inventor, and a research scientist, as well as an artist, a musician, and a writer. He was also the son of a runaway slave. Latimer studied both draftsmanship and engineering in school. Although Thomas Edison invented the light bulb, it was Lewis Latimer who improved it by making a more efficient and longer lasting bulb. Mr. Latimer patented a light bulb with a wide carbon strip between its two metal wires. His invention reduced the high cost of electric lights. Thomas Edison was so impressed with Lewis Latimer's invention that he asked him to join the Edison Electric Light Company. Lewis also designed other inventions. For example, he worked with Alexander Graham Bell in drawing the plans for the first telephone. Lewis Latimer was one of the inventors who contributed to the success of the American Industrial Revolution.

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Lewis Latimer's Patent Diagram of the Electric Lamp

(No Model.)

J. V. NICHOLS & L. H. LATIMER.

ELECTRIC LAMP.

No. 247,097. Patented Sept. 13, 1881.

Fig: 2.

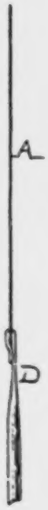


Fig: 1

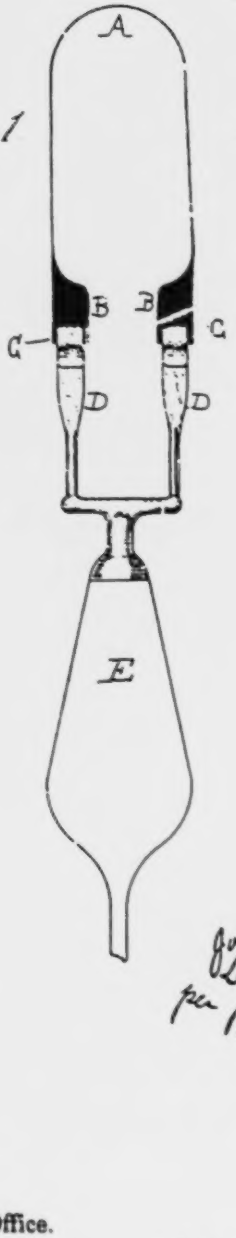
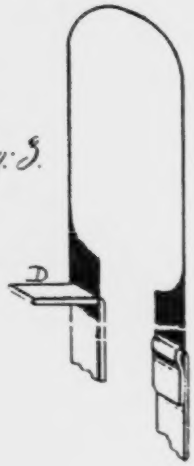


Fig: 3.



Witnesses.

Henry G Beasley
Edw Gulager

Inventors.

Joseph V. Nichols and
Lewis H. Latimer
per Parker W. Page atty

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MAKING COMPASSES

Subject:
SCIENCE

Grade Level:
3 - 4

Concept Statements

- *An iron object can be magnetized by stroking it with a magnet.*
- *Magnets can be used to locate magnetic north.*
- *A compass contains a freely moving magnetized object.*

Instructional Objectives

The student will:

- Describe methods of finding direction.
- Construct a compass.
- Use a compass to locate direction.
- List skills required by an aviation pilot.

African American Role Models

The student will:

- Identify Bessie Coleman as the first Black female pilot in the world.
- Identify other pilots and their contributions and their achievements in the field of aviation.

Affective Factors

- *Eliminating Stereotyping* - Students learn that there are Black aviators and present day male and female African American commercial pilots.
- *Perceived Utility* - Students learn that direction finding skills are useful when they travel.
- *Persistence* - If you really want to do something, you can do it even if somebody like yourself has never done it before.
- *Influence of Significant Others* - Students learn that they can explore nontraditional careers such as aviation.

Materials

Cardboard
Cork
Darning needle
Glass Dish
Jar
Paper
Permanent magnet
Silk thread
String

Vocabulary

Compass
Direction
East
Magnet
Navigator
North
Pilot
South
West

Teaching Procedures - Lesson 1

- Lead a discussion about direction, its importance, and how it is determined. Students should understand that direction is necessary for travel and can be determined in a variety of ways:

Compass	Road signs
Maps	Sun and stars

  Point out that generally one direction is identified and then we can determine other directions. Ask students to describe how this is done and give them some examples to try (a sign shows that a road leads North and travelers determine South, East, and West).

- Ask students to identify situations in which direction finding is important. Students should include travel on land, water, air, and space. Point out that sometimes there are no signs or landmarks (ocean, air, space travel). Ask students to describe how they might find directions if they were in one of these situations. Students should describe using a compass or celestial objects to locate a reference point for determining direction. Discuss everyday situations in which direction finding skills are useful.

- Tell the students that they will build a compass. Demonstrate how to magnetize the needle by repeatedly stroking the needle in one direction with the magnet. Distribute the materials and the discovery guide, ***How to Construct a Needle Compass*** (page S-50). Collect the completed compasses for use in the next science class.

Teaching Procedures - Lesson 2

- Review concepts related to direction and how compasses are made. Show the students one of the completed compasses and ask how they might determine which needle end points North or South. The needle end that attracts the South end points North. After North and South are determined, the students should find East and West. Another way might be to use another compass that is known to point North as a reference compass. Allow the students to determine the direction indicated by the two ends of the compass they constructed.

- Ask the students who would be responsible for determining direction and setting a destination course on airplanes, boats, or spacecraft. Tell them that there have been Black people who have made contributions to the field of aviation. Display photographs of these pilots (pages S-54 through S-56) and describe their careers as indicated in the biographies, ***Four Pilots: Jesse LeRoy Brown, Eugene Jacques Bullard, Willa Brown Chappell, and Bessie Coleman*** (pages S-51 through S-53).

- Lead a career discussion about pilots, including necessary skills: clear eyesight, sharp listening skills, effective communication, concentration, dexterity, and good reflexes. Ask the students to describe why these skills would be important. As part of this discussion, review concepts related to direction and the compass.

Follow-up Activities

- Explore other methods of finding direction: Polaris (North Star), pleurococcus (a green alga) grows on the North side of trees, the sun and moon rise in the East and set in the West, and hands on a clock face (see directions below).
  - Lay a clock or watch flat.
  - Rotate the clock face until the hour hand points toward the sun.
  - South is halfway between the hour hand and the numeral 12 (Northern Hemisphere only).
  - Ask students to modify the procedure for the Southern Hemisphere (North is halfway between the hour hand and the numeral 12).
- Arrange a field trip to a local airport. Request a tour of the facilities, equipment and, if possible, the cockpit of an airplane. Identify the plane's compass and navigational maps. Ask a pilot or tower operator to describe what is involved in flying an airplane.
- Ask the students to complete the attached worksheet, ***Flying Across Africa*** (page S-57).
- Discuss methods of finding direction used by astronauts. What skills do astronauts need to carry out their mission?

Resources

"Black Pilots." *Ebony*. Chicago: Johnson Publications, (January, 1978).

"Black Wings: The American Black in Aviation." Washington, D.C.: Smithsonian Institution. 1983. (Filmstrip) (Purchase from the National Air and Space Museum, Education Department, (202) 357-1400. Available in elementary and secondary editions.)

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Francis, Charles E. *The Tuskegee Airmen: The Men Who Changed a Nation.* Boston: Branden Publishing Company, 1988.

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Hogan, Paula Z. *The Compass.* New York: Walker, 1982.

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Ruskin, William. *How a Compass Works.* Colorado Springs: Christopher Compass, 1980.

A Salute to Historic Black Women. Kankakee, IL: Empak Enterprises, 1984.

Schuon, Karl. *U.S. Navy Biographical Dictionary.* New York: Franklin Watts, 1964.

Discovery Guide:

How to Construct a Needle Compass

1. Magnetize a darning needle by stroking the length of it 30 times with the north end of a bar magnet. By stroking from the eye to the point the latter will become the south pole.

2. The magnetic needle must be put into a situation now where it can freely turn until it lines up with the magnetic poles of the earth.

3. It may be inserted through a cork and floated in a glass dish partly filled with water, or the needle may be fastened to a cardboard suspended by a silk thread in a pint jar.

4. Be sure no other magnet or iron object is near. They will prevent the compass from functioning properly.

5. The point of the needle will point south – the south-seeking pole. The eye of the needle will point north – the north-seeking pole.

Reprinted with permission. *The Young People's Science Encyclopedia.* Chicago: Childrens Press Inc., 1970.

Biographies:
Four Pilots

Jesse LeRoy Brown
(1926-1950)

In 1949, Jesse L. Brown became the first Black pilot in the United States Naval Reserve. After graduation from college, he received his Navy wings and became a combat pilot, and later a section leader during the Korean War. Brown earned both the Air Medal and the Flying Cross for his courage and dedication. On December 5, 1950, Jesse Brown was the first Black Naval officer and the first Black Naval pilot to be killed in action. He was flying an air support mission over the Changjin Reservoir in Korea when his aircraft was shot down. He was just 24 years old. In his honor, the U.S. Navy commissioned the U.S.S. Jesse L. Brown in 1973. This ocean escort ship was dedicated at the Boston Naval Yard in tribute to a great American naval pilot.

Eugene Jacques Bullard
(1894-1961)

Eugene Bullard was an American pilot who flew planes for the French during World War I. When he was very young, Eugene's father told his son stories about relatives in the French colony of Martinique. These relatives were treated fairly by the government because the color of one's skin does not matter in France. This sounded good to Eugene. When he was 8 years old, Bullard sold the family goat for $1.50 to go to France. Eugene Bullard stowed away on a ship, but was discovered. The ship's captain made Bullard shovel coal to pay for his passage to Scotland. While there, Eugene worked several odd jobs to earn his passage to

Continued on next page

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France. Eugene Bullard was the first Black American in the French Volunteer Army and the only Black American pilot in World War I. He flew all of his missions with a monkey named Jimmy as his copilot. Bullard's men nicknamed themselves the "Swallows of Death" and nicknamed their leader the "Black Swallow." The French government awarded Bullard, a machine gunner, 15 medals because of his bravery and valor. After he left the French Army, Eugene Bullard became a boxer and a nightclub owner in France. He helped other Black Americans who, like himself, left the United States because of racism. One person he helped was the famous poet and writer Langston Hughes. Eugene Jacques Bullard lived a successful life as a Black American in France.

Willa Brown Chappell

(1906-)

Willa Brown Chappell was the first Black officer on the Civil Air Patrol. Ms. Chappell studied aerodynamics and meteorology at the Aeronautical University in Chicago, Illinois. She received a Private Pilot Certificate and a Limited Commercial Pilot License. Willa Brown Chappell co-owned and operated the Coffey School of Aeronautics at the Harlem Airport in Oak Lawn, Illinois. This school offered Civilian Pilot Training programs and War Training services during World War II. In 1939, the Civil Aeronautic Authority appointed Chappell the coordinator of pilot training in Chicago. She co-founded the National Airman's Association of America and was a pioneer member of the Women Flyers of America. Today, Willa Brown Chappell continues to contribute to Black history, and is a lecturer, a researcher, and a writer on Black Americans in the field of aviation.

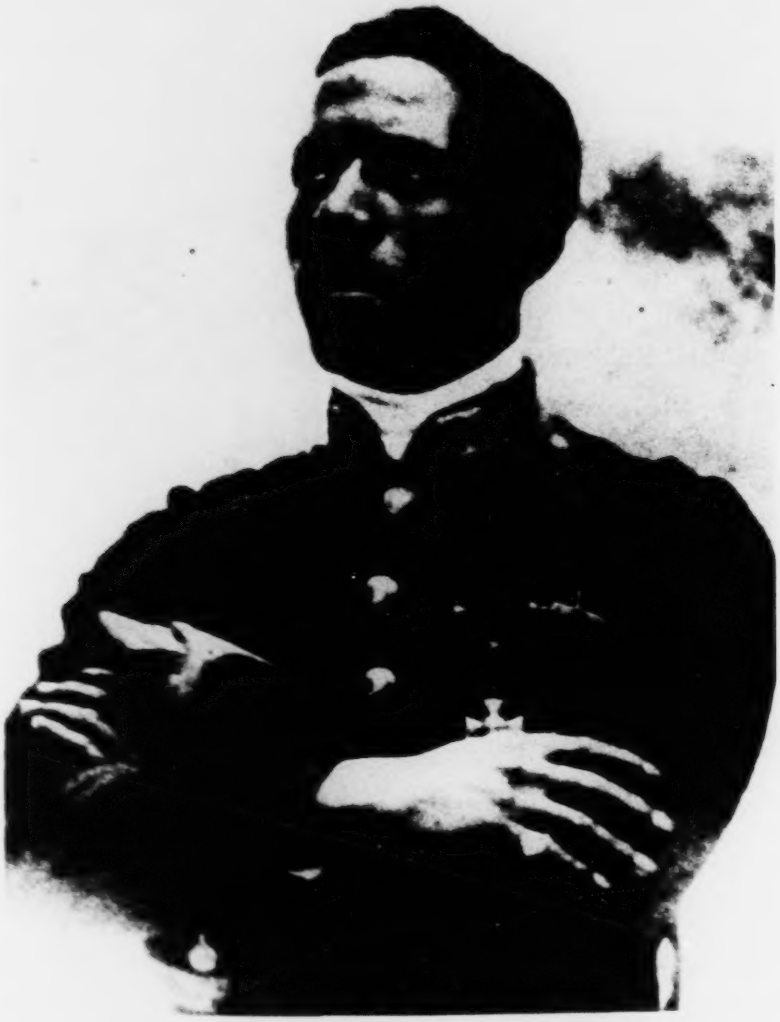
Continued on next page

Bessie Coleman

(1893-1926)

Bessie Coleman was the first Black woman pilot in the world. Born in Atlanta, Texas, she had 13 brothers and sisters. Her family was poor, but Bessie's mother wanted her children to receive an education. Twice a year she checked out books from a traveling library so that her children could learn to read. Bessie Coleman was a good reader and every evening she read to her family stories about famous Black people. Bessie's father left the family and went to Oklahoma, leaving Bessie's mother to raise their children alone. The children did odd jobs and picked cotton to help their mother support the family. Bessie wanted to attend college, so she saved the money she earned from washing and ironing clothes. Coleman attended Langston Industrial College, now Langston University, but could only afford to study for one semester. After World War I, Bessie Coleman decided she was going to learn to fly. Her attempts to receive flying lessons in the United States were met with prejudice because she was a Black woman. Like Eugene Bullard, Bessie Coleman went to France to become a pilot. There she studied under the best pilots in Europe. In 1922, Coleman returned to the United States to open a flying school to teach other Black aviators. To raise money for her school, she held flying exhibitions. However, while she was giving an exhibition in Jacksonville, Florida, her plane went into a nose dive and crashed. Bessie Coleman died on April 30, 1926. Every year on Memorial Day pilots fly over Bessie Coleman's grave and drop flowers in her honor.

Eugene Jacques Bullard



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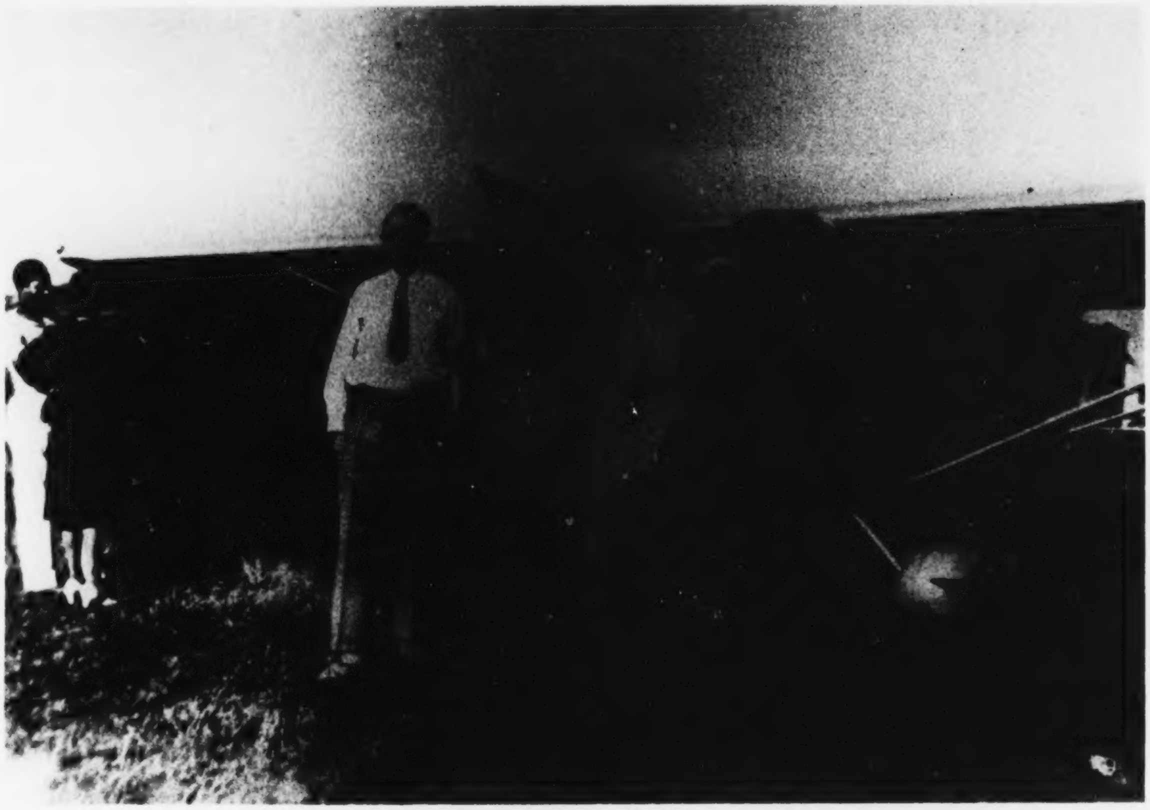
Willa Brown Chappell



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Bessie Coleman

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Name ______________________________ Date ______________

Worksheet:

Flying Across Africa

1. For each set of pilots and their flight, place a green dot at the point of departure (from) and a red dot at the point of arrival (to) on the map of Africa that appears on the next page.

2. Draw a line connecting each set of dots and write the names of the pilots on each line.

   A. Pilots Tanya and Walter are flying from **Lagos, Nigeria** to **Addis Ababa, Ethiopia**.

   B. Pilots Leroy and Karen are flying from **Marrakesh, Morocco** to **Abidjan, Ivory Coast**.

   C. Pilots Sarah and Maria are flying from **Cape Town, South Africa** to **Cairo, Egypt**.

   D. Pilots José and Peter are flying from **Nacala, Mozambique** to **Lobito, Angola**.

3. In the spaces below, write the direction in which the flight is made (from North to South, South to North, East to West, or West to East).

   A. Pilots Tanya and Walter flew from ____________ to ____________.

   B. Pilots Leroy and Karen flew from ____________ to ____________.

   C. Pilots Sarah and Maria flew from ____________ to ____________.

   D. Pilots José and Peter flew from ____________ to ____________.

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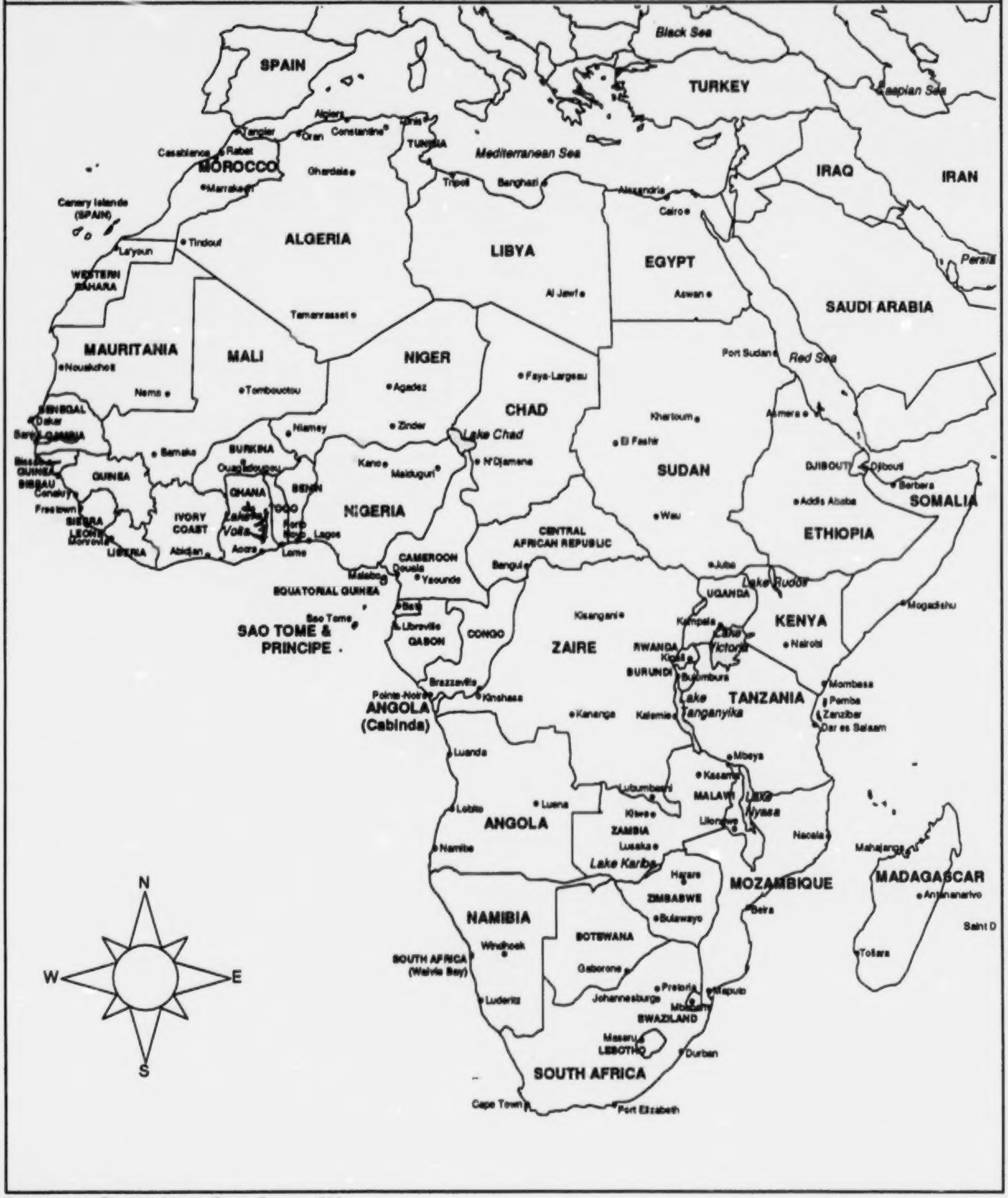
Name ______________________________ Date ________________

Worksheet:
Map of Africa



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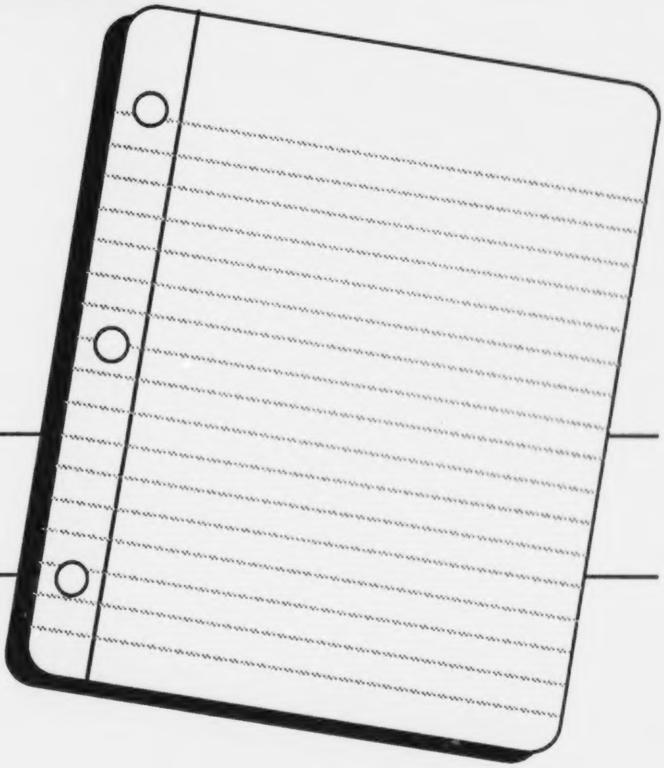
INTRODUCING AFRICAN AMERICAN ROLE MODELS INTO SCIENCE LESSON PLANS



Grades 5 - 6

THE MOON'S SURFACE

Subject:
SCIENCE

Grade Level:
5 - 6

Concept Statements

- *The moon's irregular surface is caused by bombardment and volcanic eruptions.*
- *Asteroids and meteorites strike the moon's surface.*

Instructional Objectives

The student will:

- Construct a model of the moon's surface.
- Make a record of craters formed by pebbles striking a mud surface.
- Understand that studying the moon helps us to learn more about the Earth and how the solar system was formed.

African American Role Models

The student will:

- Identify Colonel Guion S. Bluford Jr., Colonel Charles F. Bolden Jr., and Dr. Mae C. Jemison as three astronauts.

Affective Factors

- *Eliminating Stereotyping* - Students recognize that African Americans have participated in the space program.
- *Persistence* - Students understand the role of education in preparing for participation in the space program.

Materials

Lamp
Light-colored ball
Newspapers
Pan
Pebbles
Soil
Sticks for stirring
Water

Vocabulary

Asteroid
Astronaut
Crater
Meteorite
Reflection

Teaching Procedures - Lesson 1

- Conduct a discussion in which the students describe what they know about the moon. Included might be the following:
  - The moon reflects sunlight.
  - The moon's appearance changes throughout the month.
  - The moon's surface does not appear smooth.
  - The astronauts traveled to the moon.
  - The moon orbits the Earth.
  - The effect of the moon on the ocean tides.
- Tell the students that they will be investigating the moon's surface. Divide the students into small groups. Before distributing the materials, the students should cover their work area with newspaper. Tell the students they will be mixing water and soil to make mud; they will then smooth the mud's surface in the pan and drop small pebbles onto its surface. Provide the materials and allow the students to begin.
- While they are working, ask probing questions:
  - What does the mud represent?
  - What do the pebbles represent?
  - What happens to the area inside and around the craters that are formed?
  - Why doesn't the moon's surface appear smooth?

  After each student has had an opportunity to drop a pebble, ask them to diagram at least one crater. Some students might wish to include side and overhead views.

Teaching Procedures - Lesson 2

- Conduct a discussion about craters and how their investigation was similar or different to events on the moon. They should describe that craters are formed when solid objects strike the moon's surface. The moon's surface is not soft and does not contain water. However, when asteroids and meteorites strike the moon's surface at high speeds, craters similar to those formed from pebbles falling on mud are formed.
- Tell the students that these craters are observed by the astronauts who visit the moon. They should understand that scientists study the moon to learn more about Earth's history and how our Solar System was formed. If possible, show the students close-up photographs of the moon's surface. Point out craters and ridges formed from volcanic eruptions.
- Hand out the biographies, ***Three Astronauts: Colonel Guion S. Bluford, Jr., Colonel Charles F. Bolden, Jr., and Dr. Mae C. Jemison***, and show the accompanying photographs (pages S-62 through S-67). Help the students understand the importance of the astronauts' work to the space program and how we benefit. Stress that anyone wishing to participate in the space program will need to take science and mathematics courses, study hard, and stay in school to earn essential degrees.

Follow-up Activities

- Show the students a photograph of one of the Apollo astronauts walking on the moon. They should note footprints made in the lunar surface. Suggest that they compare footprints left on the moon with those made on Earth. Tell the students that since there is no wind, water, or erosion, the prints will last millions of years.
- Using the biographical sketches of the astronauts, predict tasks each might perform if assigned to a moon exploration mission.
- Ask the students to observe the moon over a period of one month. Check the newspaper to find when it will be visible. Students might make a record of their observations that includes drawings, the names of the moon's phases, and the time and day each was observed.
- Conduct the activity described in the discovery guide, ***What is the Position of a New Moon in the Sky?*** (page S-68).

Resources

Armbruster, Ann and Elizabeth Taylor. *Astronaut Training.* New York: Franklin Watts, 1990.

Benson, Kathleen and Jim Haskins. *Space Challenger: The Story of Guion Bluford.* Minneapolis: Carolrhoda Books, Inc., 1984.

Carey, Helen. *The Moon.* Milwaukee: Raintree Publishers, 1990.

Knight, David C. *The Moons of Our Solar System.* New York: William Morrow and Company, 1980.

Kopal, Zdenlek. *A New Photographic Atlas of the Moon.* New York: Taplinger, 1971.

Poskanzer, Susan Cornell. *What's It Like to Be an Astronaut.* Mahwaj, NJ: Troll Associates, 1990.

Sutton, Felix. *The How and Why Wonder Book of the Moon.* Chicago: J. G. Ferguson Publishing Company, 1987.

Taylor, Glenn. *A Kid's Guide to Living on the Moon.* Mankato, MN: Capstone Press, 1989.

Additional information, including pictures and biographies of astronauts, can be obtained at no charge from:

NASA Headquarters
Publications Office
400 Maryland Avenue, S.W.
Washington, D.C. 20546
(202) 453-8332

Public Service Office
Biographies
(202) 453-8315

Activities for groups can be obtained from:

Young Astronauts Programs
1015 Fifteenth Street, N.W.
Suite 905
Washington, D.C. 20005
(202) 682-1985

Colonel Guion S. Bluford, Jr.

(1942-)

Colonel Guion S. Bluford was the first African American astronaut in space. He received this distinction after he boarded the Space Shuttle Challenger in 1983. Colonel Bluford is also an accomplished pilot and aerospace engineer. An aerospace engineer is someone who uses mathematics and science to study the Earth's atmosphere and outer space.

When Colonel Bluford was growing up, he always liked to watch airplanes and was fascinated by them. During the summers he spent time at the local YMCA. One summer during afternoon arts and crafts, he built his first model airplane. This experience would greatly influence Colonel Bluford's decision to become an astronaut and a pilot.

Colonel Bluford was also very fortunate to grow up in an environment with college educated grandparents and parents where the children were expected to go to college. His grandfather was a high school science teacher who exposed Colonel Bluford's father to science. This encouraged his father to become a mechanical engineer and provided Colonel Bluford with a role model at home. Also, Colonel Bluford's mother was a special education teacher in the Philadelphia public schools who stressed the importance of education to Guion and his two brothers.

Although Guion had a strong interest in mathematics and science he did not consider himself a "brain." He was, however, better in the natural sciences than in the social sciences. Also, when Colonel Bluford was young, there wasn't a space program and the job of an astronaut did not exist. But seeing how much his father enjoyed being an engineer

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combined with his fascination for flying helped him decide to become an aerospace engineer.

When he attended Pennsylvania State University, he joined the Air Force ROTC program. Colonel Bluford took advanced ROTC courses and was named the 1964 Distinguished ROTC Graduate. After graduating with a degree in aerospace engineering, Colonel Bluford received pilots' training at Williams Air Force Base in Arizona and earned his pilots' wings in January 1965. He then flew in the Vietnam War in 144 combat missions. For his bravery as a jet fighter pilot, he received the Vietnam Cross of Galantry and the Vietnam Service Medal.

Because Colonel Bluford wanted to become an astronaut, he joined NASA in 1977, and in 1979, he became an astronaut. Colonel Bluford encourages children to set high goals, and get as much education in mathematics and science as possible. Colonel Guion S. Bluford's dedication is an inspiration to many Americans.

Colonel Charles F. Bolden, Jr.

(1946 -   )

Colonel Charles F. Bolden was a pilot on the crew of the Space Shuttle Columbia, launched in 1986, and the Space Shuttle Discovery, launched in 1990. Charles Bolden attended C.A. Johnson High School in South Carolina and graduated in 1964. He then attended the United States Naval Academy in Annapolis, Maryland where he received a Bachelor's degree in electrical science. After his graduation, he entered the Marine Corps and became a pilot in the Vietnam War. Colonel Bolden flew more than 100 missions over North Vietnam, Cambodia, and Laos in an A-6A Intruder aircraft. He also worked as a Marine recruiter and as a Navy test pilot. In 1981, he became an astronaut for NASA and qualified for assignments as a Space Shuttle pilot. Colonel Charles F. Bolden has piloted three Space Shuttle flights and has spent over 267 hours in space.

Continued on next page

Dr. Mae C. Jemison

(1953-)

Dr. Mae C. Jemison was a mission specialist on the STS-47 Space Lab J, a joint mission between Japan and the United States. She was born in Decatur, Alabama on October 17, 1953. She is a graduate of Stanford University and holds degrees in chemical engineering, African and African American studies. Dr. Jemison received her doctorate in medicine from Cornell University in 1981. Mae Jemison enjoys sewing, skiing, and collecting African art. She also worked for the United States Peace Corps in Liberia and Sierra Leone. Dr. Mae C. Jemison completed the one year astronaut training program in August 1988. As a mission specialist, Jemison conducts life science experiments in space. Dr. Jemison's experiments are important contributions to our knowledge of space and medical science.

Colonel Guion S. Bluford, Jr.

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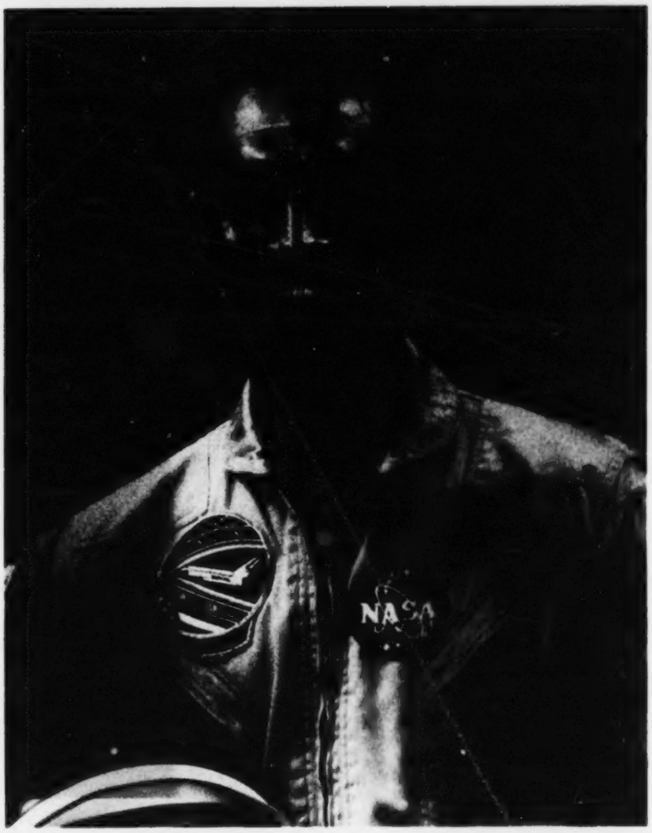
Colonel Charles F. Bolden, Jr.



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Dr. Mae C. Jemison

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Discovery Guide:

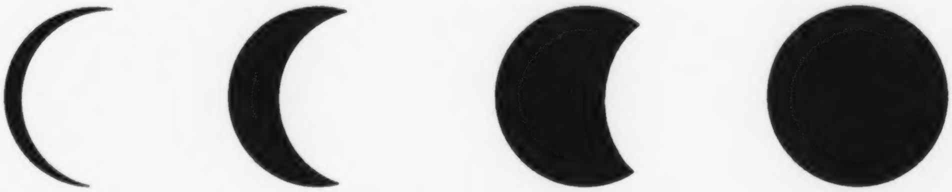
What is the Position of a New Moon in the Sky?

Materials: a lamp without a shade, and a light-colored ball

1. In a darkened room, hold the ball out in front of you so it is in line with your eyes and the bulb in the lamp. The light is the sun, the ball the moon, and you are on the Earth.

2. Now move the moon slightly to the left of the bulb. How much of the moon is lighted at this point? This is a new moon.

3. Keep rotating with the ball in front of you. At which point is there a full moon?



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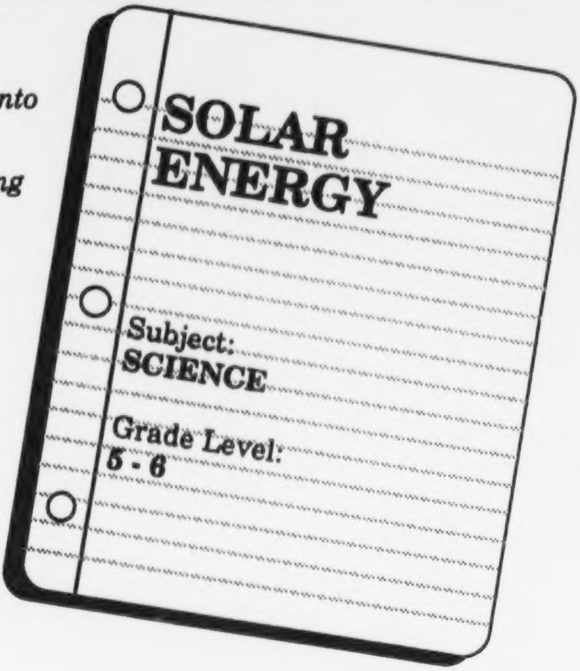

SOLAR ENERGY

Subject:
SCIENCE

Grade Level:
5 - 6

Concept Statements

- *Light energy from the sun can be converted into heat energy.*
- *An area enclosed with a transparent covering heats up due to the greenhouse effect.*

Instructional Objectives

The student will:

- Describe the sun as a source of energy.
- Identify forms of energy that come from the sun.
- Investigate the greenhouse effect.
- Describe solar energy as a way of conserving energy.

African American Role Model

The student will:

- Identify Dr. Lawnie Taylor as a physicist who specializes in solar energy.

Affective Factors

- *Eliminating Stereotyping* - Students recognize that African Americans have made contributions to the field of energy conservation.
- *Perceived Utility* - Students learn of the needs and benefits of energy conservation technology and how the study of science is applicable to everyday life.
- *Attitudes* - Help students maintain positive attitudes toward mathematics and science by identifying specific areas in these disciplines that can be helpful in their lives.

Materials

Cardboard boxes
Plastic wrap
Scissors
Sheets of cardboard
Tape
Thermometers

Vocabulary

Conservation
Energy
Greenhouse Effect
Heat
Solar
Thermometer

Teaching Procedures - Lesson 1

- Conduct a discussion about energy from the sun and ways it can be used by people. Students should describe sunlight as solar energy and a provider of heat. Have them list examples of the sun's energy, similar to the following:
    - Car interiors heat up in strong sunlight.
    - Sunny windows are warm.
    - Greenhouses help keep plants warm.
    - Roads, sidewalks, and sand can heat up in the summer sun.
- Ask the students to suggest ways sunlight could be used as a home energy source. They might describe using sunlight to heat air and warm water for very little cost.
- Tell the students that they are going to investigate sunlight as an energy source. Distribute worksheet, ***Sunlight as an Energy Source*** (page S-72), and the necessary materials to small groups of students. Direct them to record the temperatures inside the two boxes before placing them in direct sunlight and also after 15 minutes of exposure. Collect the materials and worksheets for use in later discussions.
- Ask the students to describe what happened during their investigation. Help them understand that the sun's light affected the two boxes in different ways. They should point out differences in each box that might have affected the box temperature.

Teaching Procedures - Lesson 2

- Distribute the worksheets completed in Lesson 1, and ask the students to discuss the investigation and their findings. They should describe the differences in the boxes and the temperature gains for each.
- Ask the students the following questions:
    - Which box had the largest amount of sunlight changed into heat?
    - Which boxes might represent a house with closed windows? Why?
    - Which box arrangement might represent the best way to capture light energy in the winter? Why?
    - Which box arrangement might represent the best way to avoid capturing light energy in the summer? Why?
- Introduce the term, *Greenhouse Effect*, exploring the effects on the world and in the students' daily lives. The transparent plastic allows sunlight to enter the box. When the light strikes the inside of the box, it is converted into heat. The plastic does not allow the heat to escape and the heat builds up. Encourage the students to describe how they might use the results of this investigation to keep a home warm in the winter and cool in the summer.
- Conduct a discussion about energy conservation, why it is important, and how the use of solar energy can help. Students should understand that many home builders are making use of designs that capture sunlight in winter as an energy source. Techniques are also used to prevent sunlight from entering homes during the summer.

- Distribute the biography, ***Dr. Lawnie Taylor: Scientist*** (page S-73). Discuss career opportunities in energy conservation and what students need to know and do to earn the necessary degrees (take science and mathematics, study hard, stay in school, etc.).

Follow-up Activities

- Demonstrate the use of solar energy by making solar tea. Seal five tea bags in a clean glass gallon jar full of water. Place the jar in direct sunlight for several hours. Allow the students to sample the tea and discuss how this technique saves energy.
- Measure the effect of light and dark colors on the absorption of light. Place dark and light colored construction paper or cloth over thermometers. Expose them to direct sunlight and observe the difference in temperature over a period of time.

Resources

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Dinsen, Jacqueline. *Energy From Sun, Wind, and Tide* (First American Edition) Hillside, NJ: 1988.

George, Michael. *The Sun.* Mankato, MN: Creative Education, 1991.

Mason, John W. *Power Station Sun: The Story of Energy.* New York: Facts on File, 1987.

Satchwell, J. *Energy at Work.* New York: Lothrop, Lee and Shepard Books, 1981.

Name ______________________________ Date ______________

Worksheet:

Sunlight as an Energy Source

Materials:

2 Cardboard boxes	Scissors
1 Sheet of cardboard	Tape
2 Thermometers	Large sheet of plastic wrap

Instructions:

1. Place a thermometer in each box. Cover the boxes with sheet of plastic wrap and tape it in place.

2. Record the temperature inside each box.

Box 1 ☐ Box 2 ☐

3. Place the boxes in direct sunlight. Box 2 should be shaded by a large piece of cardboard.

4. After 15 minutes, record the temperature inside each box.

Box 1 ☐ Box 2 ☐

5. After 15 minutes which box gained more energy? Why do you think this happened?

6. Where did the energy come from to warm Box 1? How much did it cost?

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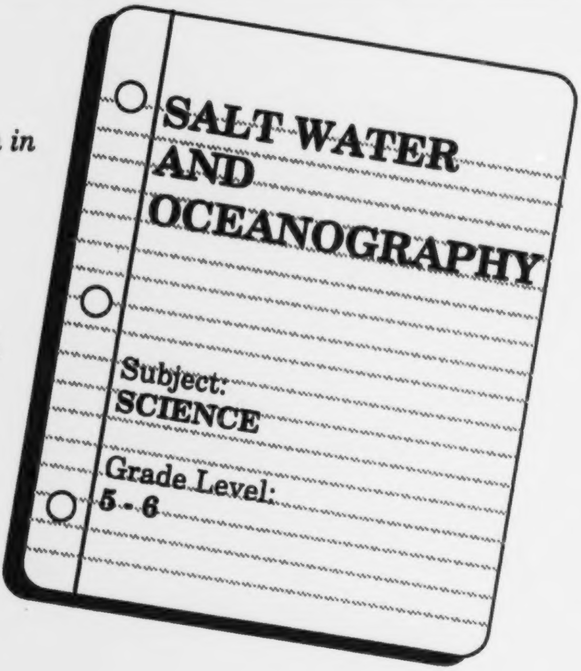
Biography:

Dr. Lawnie Taylor:

Scientist

(1902-1922)

Dr. Lawnie Taylor was a scientist who researched solar energy. He taught himself electronics as a teenager. While studying physics at Columbia University in New York, he worked as a television technician. After receiving a Doctorate degree in physics from the University of Southern California, he worked for the Energy Resource Development Administration. He also opened a building system engineering firm in Los Angeles, California. Lawnie Taylor was the Chief of Market Development and Training in the Department of Energy's solar offices. He planned and directed programs to increase the use of solar energy in home and office environments. Dr. Taylor made many contributions to the field of energy technology.



SALT WATER AND OCEANOGRAPHY

Subject:
SCIENCE

Grade Level:
5 - 6

Concept Statements

- *Ocean water contains minerals.*
- *Objects are more buoyant in salt water than in fresh water.*

Instructional Objectives

The student will:

- Describe how salt water affects floating and sinking.
- Identify topics studied by oceanographers.

African American Role Models

The student will:

- Identify the oceanographers Dr. Samuel McCoy and Mary Middleton. Describe the importance of their work.

Affective Factors

- *Persistence* - becoming an oceanographer involves the study of a particular science: biology, chemistry, geology, or physics (an awareness of one of the other sciences is helpful). Specialization on the graduate level in whichever discipline results in a specific type of oceanographer, i.e. physics – physical oceanographer.
- *Perceived Utility* - Knowledge of the ocean is the basis for many careers.

Materials

Fresh egg
Plastic container
Plastic spoon
Salt
Water

Vocabulary

Chemicals
Fresh water
Geography
Hydrogen
Life science
Ocean water
Oceanographer
Oxygen
Physical science
Salt

Teaching Procedures - Lesson 1

- Conduct a discussion about water, its composition, and the properties of water found in different locations. Students should understand that although all water is basically the same chemical (two parts hydrogen and one part oxygen: H_20), water can contain additional chemicals. Students might be able to share their experiences of tasting water during travel; swimming in the ocean, spring-fed lakes, or rivers; or washing their hair with rainwater. Ask the students to describe why they think the water might have been different.

- Have students examine the floating and sinking of objects in fresh and salt water. Distribute to the students a set of materials including a cup of water, a fresh egg, a plastic spoon, and salt. Describe how they will investigate the floating and sinking of the egg in fresh and salt water. The students should understand that they will follow these steps:
  - Place the egg in the cup of water.
  - Observe the egg's position in the water.
  - Add salt to the water and stir slowly.
  - Continue adding salt until there is a change in the egg sinking or floating.
- Ask students to suggest the major difference between ocean water and fresh water (presence or absence of salts). Encourage them to describe how differences in salt content might affect floating and sinking. Some students may be able to describe their experiences when swimming in fresh water (pools, lakes, rivers) and ocean water. Ask the students to describe what happened when salt was added to this water. Encourage them to compare the water to fresh and ocean water.

Teaching Procedures - Lesson 2

- Review concepts related to differences in water and how salt affects objects in water. Students should discuss how and why objects float better in salt water. If the students have not mentioned it earlier, ask them to compare the different life forms that can be found in fresh and salt water.
- Introduce oceanography as the study of the ocean and ask students to suggest the kinds of topics that an oceanographer might study. The following topics should be included:
  - *Life forms:*
    - Animals
    - Plants
  - *Physical properties:*
    - Chemical composition
    - Temperature
    - Currents
    - Tides
  - *Geographical features:*
    - Geology of the ocean floor
    - Water depth
    - Topography of the ocean floor
- Distribute and read the biographies, ***Two Oceanographers: Samuel E. McCoy and Mary Middleton*** (page S-78), and photograph of Samuel E. McCoy (page S-79).
- Point out to the students that oceanographers need to know a great deal about many topics. Refer to the list of topics above and identify the subjects that might be studied in school (high school, college) by a person preparing to become an oceanographer.

Follow-up Activities

- Arrange a tour of a local ocean museum or exhibit, such as the National Aquarium in Baltimore, Maryland. Try to learn more about the differences between ocean and fresh water and the kinds of organisms that live in each. If no museums or exhibits are available, arrange to visit a local aquarium store. The store staff should be able to provide similar information.
- Investigate what happens when water is allowed to evaporate. Obtain water from a variety of sources. If salt water is not available, it can be simulated by dissolving 35 grams of table salt into 1000 grams of water. Place small amounts of each kind of water into clear plastic tumblers. After the water has evaporated, observe the tumbler surfaces with a magnifying glass.
- Discuss some disadvantages of hard water (water with high mineral content) and technological solutions of the problems it causes.
- Investigate desalination projects of the United States and other countries, particularly those in the Middle East.

Resources

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Biographies:

Two Oceanographers

Samuel E. McCoy

(1935-)

Samuel E. McCoy is a retired oceanographer with the National Oceanic and Atmospheric Administration (NOAA). He was in charge of providing information on ocean currents, ocean tides, and water circulation. McCoy has always loved the ocean; he enjoyed fishing, sailing, and shell collecting as a child. Samuel McCoy joined the Navy after his high school graduation. After four years of naval service, McCoy received an honorable discharge. He attended the University of the District of Columbia and received a Bachelor's degree in 1962. Samuel then spent 28 years working at the NOAA as a research manager and a senior scientist. Today, McCoy is a teacher at the J.F. Cook Arts and Science School in Washington, D.C. He teaches mathematics and oceanography to students in the intermediate grade levels. Samuel McCoy encourages students with an interest in mathematics and science, as well as a love of the sea, to study oceanography.

Mary Middleton

(19-- -)

Mary Middleton is one of the first women in the United States Navy assigned to underwater acoustics. Although she was a busy housewife and mother, she was also a statistical clerk with the Navy. She was often asked to help with many other projects. This on the job training combined with her taking classes at The American University and George Washington University gave her the skills necessary to become a successful oceanographer. Today, Mary Middleton lives in Washington, D.C.

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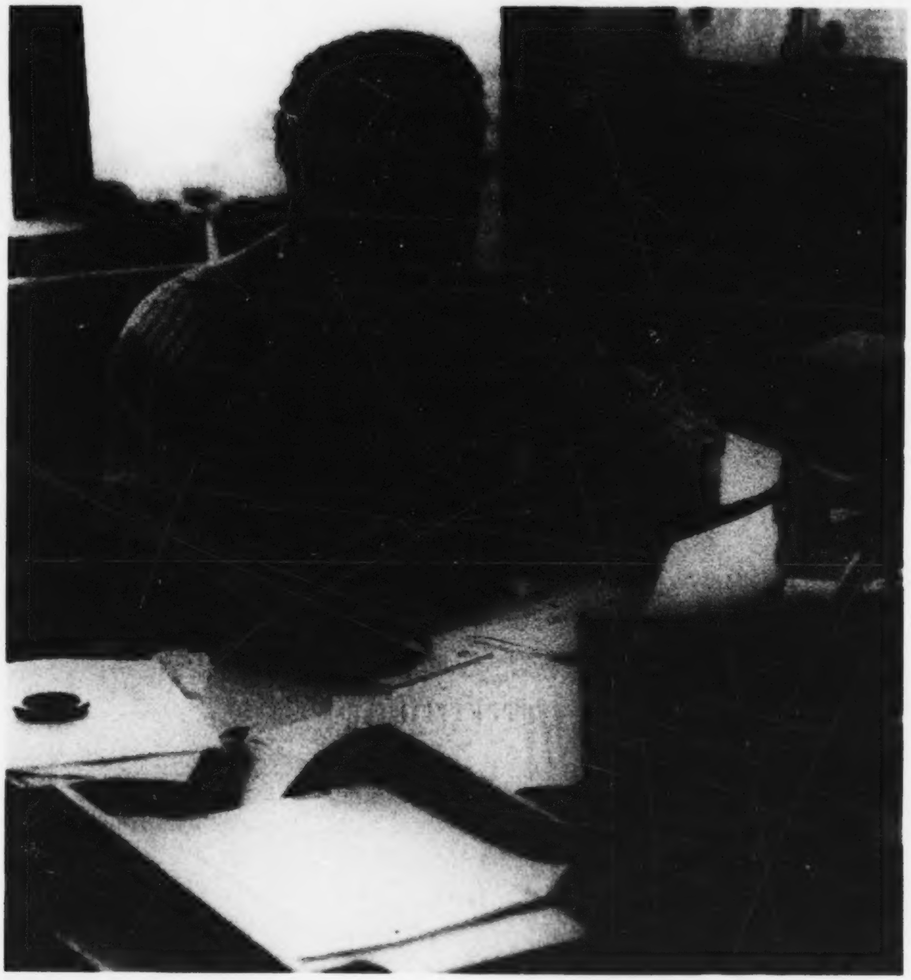
Samuel E. McCoy



Courtesy of Samuel E. McCoy, 1991.

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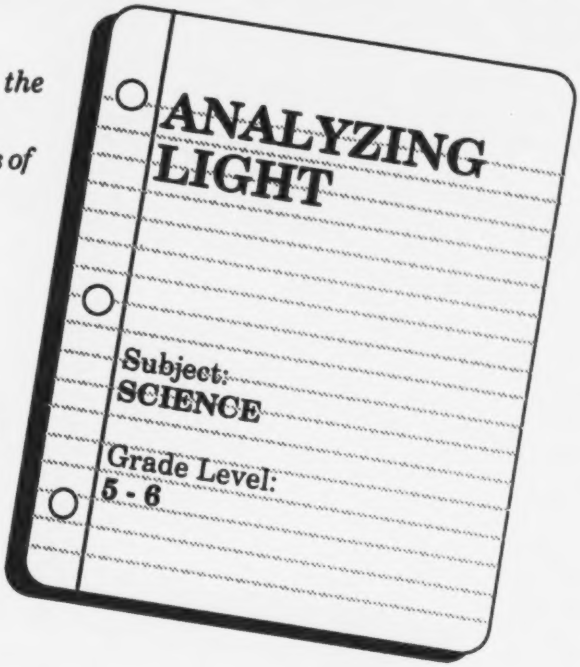

ANALYZING LIGHT

Subject:
SCIENCE

Grade Level:
5 - 6

Concept Statements

- *White light is composed of all colors in the spectrum.*
- *Different light sources give off different types of light.*

Instructional Objectives

The student will:

- Describe white light as composed of a mixture of colors.
- Use a diffraction grating to separate light into separate colors.
- Compare the light from several light sources.
- Describe a spectroscope as a tool for studying light and light sources.

African American Role Model

The student will:

- Identify Dr. George Carruthers, as a scientist, who studies light to learn about the Earth and space.

Affective Factors

- *Eliminating Stereotyping* - Students recognize that African Americans develop scientific tools for scientific research.
- *Attitudes* - Students are motivated to investigate light and its colors.
- *Perceived Utility* - Students learn that studying light has practical applications.

Materials

Candle
Cardboard
Colored markers
Diffraction grating
Fluorescent light fixture
Incandescent lamp
Jars
Matches
Milk
Prism

NOTE TO THE TEACHER:

Diffraction gratings can be found in many school science kits, including the *5th Grade Concepts in Science Laboratory (Purple)* - Harcourt, Brace, Jovanovich Publishers.

Diffraction gratings can be purchased from Edmund Scientific, 101 E. Gloucester Pike, Barrington, NJ 08007. Bag of 40 (2" x 2"), #F1307. Sheet (8-1/2" x 11"), #F40267.

Vocabulary

Fluorescent	Properties
Incandescent	Spectroscope
Light source	Spectrum

Teaching Procedures - Lesson 1

- Use a prism to show that white light is composed of the colors of the spectrum.
- Conduct a discussion in which light sources and properties of light are described. Included might be the following:
    - White light is a mixture of all colors in the spectrum.
    - Black is the absence of light.
    - Light is a form of energy.
    - Heat is usually associated with the production of light.
    - The spectrum is composed of **r**ed, **o**range, **y**ellow, **g**reen, **b**lue, **i**ndigo, and **v**iolet waves (**ROY G. BIV**).
    - A rainbow is an example of a spectrum.
- Tell the students that scientists can study objects by observing light that is given off or passed through the objects.
- Turn on a fluorescent light and an incandescent light, and light a candle. Allow the students to observe these light sources and describe their differences. Students will likely notice differences in brightness and color. Tell the students they are going to study the light with a diffraction grating. A diffraction grating is a transparent piece of colorless plastic on which hundreds or thousands of slits have been etched or scratched. When light passes through the grating, it is bent and separate colors are visible. Scientists study these colors and the amount of each to determine the chemical composition and properties of the light source. Show the students a diffraction grating and demonstrate how to hold it in front of one eye while looking at a light source. Caution them to handle the gratings by the edges or cardboard frame.
- Provide each student with a diffraction grating. Darken the room and turn on a fluorescent light. Allow the students to observe the light. Encourage them to record their observations on the worksheet, ***Observing Light with a Diffraction Grating*** (page S-84). Repeat the observations with an incandescent light and a lighted candle. Other possible light sources might be a black and white television picture, a beam of sunlight passing through a window blind (***do not*** **allow the students to look directly toward the sun as they could seriously damage their eyes**), a night light, and a neon light. Collect the materials and worksheets for use in later discussions.
- Ask the students to describe any differences they observed when they viewed the lights through the diffraction grating. Encourage them to describe the grating as a tool for analyzing light.

Teaching Procedures - Lesson 2

- Refer to the worksheets completed in Lesson 1, and ask the students to discuss the investigation and their findings. The students should describe the different light sources and the spectra that they observed. Students should understand that each type of light source provides a unique light.
    - *Fluorescent* - mostly blue, indigo, and violet tones
    - *Incandescent* - all colors with bright red tones
    - *Candle* - all colors with bright red tones
- Introduce the students to a spectroscope by describing it as a tool scientists use to carefully separate light into all of its color components. The diffraction grating is a type of spectroscope. By using this tool, scientists can analyze light from different sources and determine the materials that are present. This is the process used to determine the composition of stars and chemicals.
- Distribute the biography, ***Dr. George Carruthers: Scientist*** (page S-85).

Follow-up Activities

- Separate light into a spectrum by holding a prism in front of a narrow beam of sunlight or a projector. Best results will be obtained by projecting the spectrum on a white surface. The spectrum is a linear depiction of the color wheel. Artists use these colors to enhance their work.
- Use a diffraction grating to analyze light that passes through colored plastic filters or cellophane. The students will find that the colored light is also a mixture of several colors.
- Discuss complementary colors and how they are intensified when they are next to each other. A color's complement is directly opposite of it on the color wheel. Blue is the complement of orange for example.
- Distribute discovery guide, ***In What Direction Does Light Travel?*** (page S-86).
- Distribute discovery guide, ***How Can You Prevent Total Reflection of Light?*** (page S-87).
- Research additional contributions Dr. Carruthers made to physics.

Resources

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Name ______________________ Date ______________

Worksheet:

Observing Light With a Diffraction Grating

Materials: Colored markers, diffraction grating

Instructions:

1. Hold a diffraction grating near one eye and shut your other eye.
2. Look at the different light sources that are shown to you by your teacher.
3. Draw a picture of the colors you see in the diffraction grating. Name the different light sources.

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Biography:

Dr. George Carruthers:

Scientist

(1940-)

Dr. George Carruthers is an astrophysicist with the Navy's Space Science Division. An astrophysicist studies the properties of planets and stars.

He was the oldest of 4 children. He had 2 brothers and 1 sister. At the age of 10, he made his first telescope. When Carruthers was 12 years old, his father, a civil engineer, died. His family moved to Chicago, Illinois, where George attended Englewood High School. As a student, he participated in several science fairs at the Museum of Science and Industry.

In 1961, he received a Bachelor of Science degree from the University of Illinois. He continued his education and received a Ph.D. in Aeronautical and Astronautical Engineering, also from the University of Illinois. Now, Dr. Carruthers conducts experiments with ultraviolet cameras. These cameras have been used to observe the comets Halley, Kohoutek, and West. Carruthers' cameras were sent into space on equipment such as Apollo-16 and the Space Shuttle. His work enables us to better understand both the Earth and the universe. In 1972, Dr. George Carruthers was honored with the Exceptional Scientific Achievement Medal, and in 1987, the Black Engineer of the Year Award. Because Dr. Carruthers realizes the importance of science and mathematics, he encourages students to take whatever science and mathematics courses are available to them in school.

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Discovery Guide:

In What Direction Does Light Travel?

1. Cut a hole through the middle of three pieces of cardboard or some other stiff paper. Stand the pieces upright about a foot apart on a table, lined so that they are in a straight line and so that you can see straight through the holes.

2. Light a candle and place it at the end of the table opposite from where you are standing.

3. Look through the hole to see if the candle can be seen. Move one of the pieces to one side.

4. What happens? What does this tell you about the direction in which light travels?

Reprinted with permission. *The Young People's Science Encyclopedia.* Chicago: Childrens Press Inc., 1970.

Discovery Guide:

How Can You Prevent Total Reflection of Light?

1. Shine a flashlight into the top of a jar of clear water. Notice how bright it is in the water, yet how the outside is dark.

2. Add a few drops of milk to the water and stir. Shine the light into the jar again. This time it appears less bright inside the jar and considerably lighter on the outside of the jar.

3. In the clear water, the light hits the jar at such a small angle that total reflection occurs. By adding other particles to the water the light hits these and is reflected out through the glass.

Reprinted with permission. *The Young People's Science Encyclopedia.* Chicago: Childrens Press Inc., 1970.

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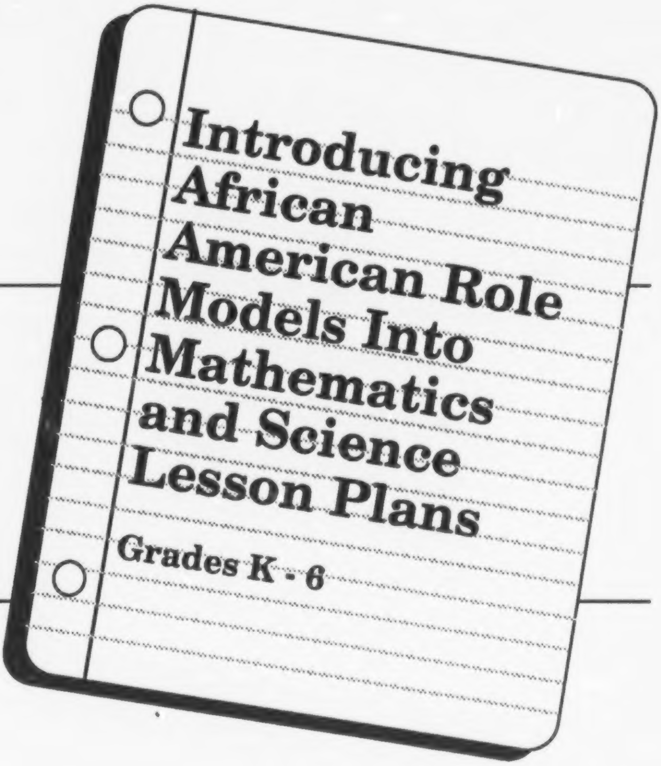
Introducing African American Role Models Into Mathematics and Science Lesson Plans
Grades K - 6

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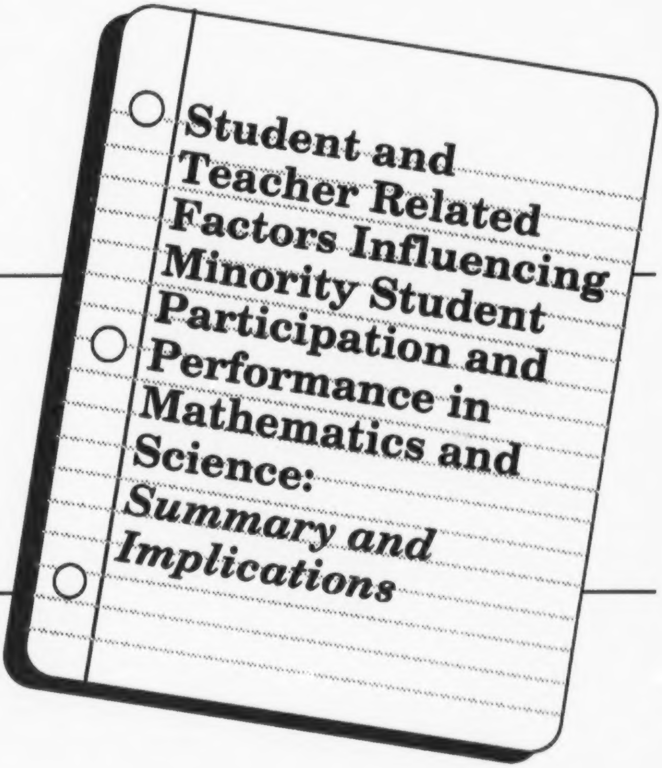
APPENDIX I:



Student and Teacher Related Factors Influencing Minority Student Participation and Performance in Mathematics and Science: *Summary and Implications*

Student and Teacher Related Factors Influencing Minority Student Participation and Performance in Mathematics and Science:
Summary and Implications

Source: Beane, DeAnna Banks.
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ATTITUDES

Factor:

Minority students have positive attitudes toward mathematics and science in early grades.

Implications For Intervention:

1. To maintain these attitudes, students must continually be involved in challenging, "hands-on" activities related to their real world.
2. They must see others, from a cultural background like theirs, who have maintained this interest in science and mathematics.

PERSISTENCE

Factor:

Those who are most successful in mathematics and science have developed the ability to persist. Having the ability to persist in the face of barriers or conflict is essential to the development of a positive self-concept.

Implications For Intervention:

3. To develop this quality, children must be encouraged through teachers' feedback and guidance to persevere as they work their way through appropriately challenging problems and situations.
4. They must be encouraged to take risks and make decisions, experience success, receive praise and constructive criticism, and recognize the relationship between their decisions, their actions and their success.
5. Teachers may require training in identifying the key elements of risk-taking and persistence in an academic setting, and in designing strategies to develop them in children.

STEREOTYPING

Factor:

Many teachers, majority and minority, as well as minority students, tend to stereotype mathematics and science as White male domains.

Implications For Intervention:

6. Teachers should introduce male and female minority persons with mathematics and science related careers. These role models can counteract race and sex stereotyping.
7. The historical and contemporary accomplishments of minorities in mathematics and science must be systematically included in the curriculum.
8. Students and teachers must become alert to the presence of race and sex stereotyping in instructional and advertising materials.
9. Multicultural audiovisual programs developed to provide children with information about science concepts and careers should be used in the classroom and at home to counteract stereotyped images.

UTILITY

Factor:

Minority students are frequently less likely to understand how the study of mathematics and science is applicable to everyday life, and valuable to their future schooling and jobs.

Implications For Intervention:

10. Good counseling, by teachers and guidance counselors, can provide a realistic picture of the relationship between students' present actions and future course and career options.
11. Exposure to people who use mathematics and science in the workplace expands the awareness of minority students regarding the usefulness of these disciplines.
12. Science and mathematics should be taught in an interdisciplinary manner, enabling students to experience mathematics as an essential tool of science.
13. Minority students must have many regular opportunities to use computers for more than drill and practice and computer-assisted instruction. Access to computer technology for creative and higher level activities increases motivation and awareness of useful applications of mathematics and science.
14. The curriculum should focus on problems, investigations, discussions, trips, and activities designed to integrate mathematics and science skills into the everyday experiences of the students.

INFLUENCE OF SIGNIFICANT OTHERS

Factor:

Teachers, counselors, parents, and peers have a role in shaping students' attitudes toward mathematics and science.

Implications For Intervention:

15. Encouraging minority students to take the more challenging educational path conveys a message of confidence in their abilities.
16. Positive, substantive interactions which communicate high expectations can become a self-fulfilling prophecy.
17. Interactions with successful older minority students, teamwork, peer tutoring, and cooperative learning strategies are effective ways to positively utilize peer influence.
18. Parent education programs help parents become aware of the importance of mathematics to their children's futures. Such programs should offer suggestions and activities for parents to use in nurturing children's interest in mathematics and science.

COGNITIVE FACTORS:

PREVIOUS EXPERIENCES

Factor:

Minority students tend to perform best when the content is related to their previous experiences.

Implications For Intervention:

19. Mathematics and science instruction must provide out-of-school experiences to make up for experiential deficits. The school curriculum should include field trips to zoos, museums, laboratories, ponds, streams, vacant lots, farms, generating plants, planetariums, aquariums, various worksites, hospitals, college campuses, etc.
20. Instruction in the classroom must be designed to include the kinds of enrichment experiences which contribute to knowledge, build self-confidence, and develop thinking skills.

ACADEMIC DEFICIENCIES

Factor:

Achievement test performances by minority students indicate growing competency in basic skills, but weakness in understanding and applying concepts.

Implications For Intervention:

21. Instructional programs which teach strategies for attacking and solving word problems in mathematics must be a curriculum component at each grade level.
22. All instructional activities must be systematically organized with clear objectives.
23. Student progress in mathematics and science must be monitored daily.
24. Activity-based science programs, when implemented with sufficient teacher training and support, significantly improve minority student performance in science process skills, science content, mathematics, and language development.
25. Math labs with manipulatives and high interest computer software can be used to develop competency in application of concepts.
26. Student teamwork and cooperative learning strategies improve motivation and achievement.

LANGUAGE

Factor:

Language minority students encounter limitations in English-speaking mathematics and science classrooms, and on achievement tests.

Implications For Intervention:

27. Activity based programs in mathematics and science with built-in linguistic objectives can increase language proficiency.
28. Teaching mathematics as a component of bilingual programs can improve the achievement of language minority children.
29. Participating in carefully structured cooperative work groups for activity-based problem solving in science and mathematics enhances achievement, self-concept, and oral and written communication skills of language minority students.
30. Direct instruction in word problem solving should emphasize tools for decoding the words and phrases.
31. Math and science content presented to students in simplified or "sheltered" English increases language competencies as well as provides content in a comprehensible form.

MISUSE OF TESTING AND TEST DATA

Factor:

The use of standardized test data to predict achievement and to assess ability is detrimental to minority students.

Implications For Intervention:

32. Tests should be used to determine a child's actual progress rather than his/her disability.

33. Teachers should receive training on the proper use of test data and the purpose of diagnostic, criterion-referenced, norm-referenced and pre-and post-tests.

34. Student performance on tests must be analyzed and errors examined to identify specific skill and concept deficiencies.

35. There must be flexibility in grouping. An analysis of errors on practice assignments and tests can be the basis on which flexible groups are formed. Activity-based science and mathematics programs also provide opportunities for flexible, heterogeneous grouping.

36. Tests should be culturally fair and should assess the skills and content actually taught.

37. The teaching of test taking skills should be integrated throughout the ongoing curriculum.

LEARNING SKILLS

Factor:

Instructional strategies frequently do not complement the learning styles of many minority students.

Implications For Intervention:

38. Through observations and/or diagnostic assessments, the learning style preferences of students can be determined.

39. Concept and skill mastery activities should include: manipulatives, experiments, listening, reading, discussion, audiovisuals, movement, practical experiences, group and individual work, contracts, learning centers, writing, role playing, simulations, interviewing, and computers for problem solving.

40. Teachers should receive training on teaching styles and learning styles followed by instructional support for developing and implementing alternative instructional strategies like those cited above. Some experiences should be designed to help students gradually learn how to function successfully in situations which do not complement their basic learning style preferences.

TEACHER EXPECTATIONS

Factor:

Educators often perceive minorities as having inferior ability. This perception translates into an expectation of low achievement which is communicated to and internalized by the minority child.

Implications For Intervention:

41. Honest self-assessment by educators is the first step in breaking this cycle. Questions like these must be asked:

a. Who are my low achievers? (Is there an overrepresentation of minority students in this group)?
b. How do I relate to minority students and low achievers?
c. Do I:
   - Interact more with high achievers and ignore and interrupt low achievers more frequently?
   - Ask more and higher level questions of high achievers and provide low achievers with questions that require only simple recall?
   - Follow up with probing questions for high achievers and call on someone else if a low achiever is unable to provide a prompt, accurate response?
   - Provide a longer wait time for high achievers to respond to a questions and cut off response time for low achievers who hesitate?
   - Seat high achievers closer to the teacher's usual position and cluster low achievers further away?
   - Praise high achievers more often and criticize low achievers more frequently?
   - Provide supportive communication for high achievers and engage in dominating behaviors with low achievers?
   - Provide high achievers with detailed feedback and give less frequent, less accurate, and less precise feedback to low achievers?
   - Demand more work and effort from high achievers and accept less from low achievers?

42. Once a staff is aware of the ways in which expectations are communicated to students, teachers can observe one another's interaction with identified low achievers and minority students. Individual teachers can then design plans for changing their own behavior in the classroom.

TEACHER ANXIETY: MATHEMATICS

Factor:

Teachers who do not have positive attitudes about mathematics are likely to provide inadequate instruction; additionally, they are poor models for mathematical competency and interest. Teachers must present to their students positive role models to encourage mathematical competency and interest.

Implications For Intervention:

43. A staff assessment of attitudes toward mathematics will (1) identify teachers experiencing mathematics anxiety or avoidance and (2) provide an opportunity for teachers to openly discuss the problem.

44. Math-anxious teachers can form a group for discussion and activities designed to change attitudes.

45. Effective in-service programs, focusing on the needs of local school mathematics courses and materials, can provide teachers with new understanding of content and teaching strategies.

TEACHER ANXIETY: SCIENCE

Factor:

Many elementary teachers avoid teaching science because they lack training in science content and science teaching methods; subsequently, they have no confidence in their ability to teach scientific subject matter.

Implications For Intervention:

46. Confidence and competency can be increased through regular participation in science in-service workshops which offer specific skills, techniques, and materials.
47. There must be ongoing opportunities to try out new science activities before using them in the classroom. Time should be provided at workshops, faculty meetings or during prearranged preparation time.
48. There should be a continual updating of current research through a review of professional journals and other materials which focus on elementary school science. These journals often combine content and suggested strategies for teachers' use.
49. The development of a supportive network which includes several science teachers from the middle or junior high schools and local college faculty should be established.

INSTRUCTIONAL PRACTICES

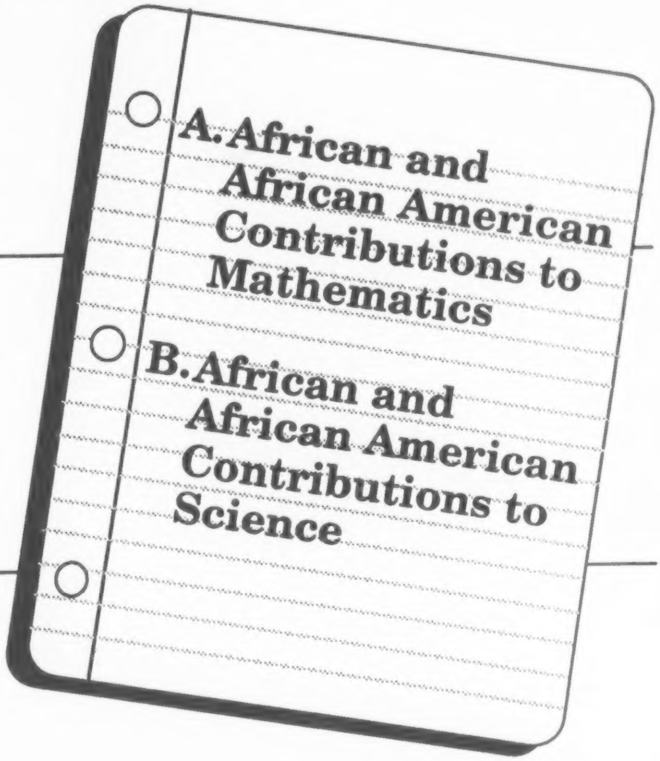
Factor:

A number of instructional practices have been associated with low achievement in minority students.

Implications For Intervention:

The above list of intervention actions offers 49 effective instructional strategies. However, one cannot overstate the importance of building the core instructional program in a cooperative learning context around an activity-based or "hands-on" curriculum. Cooperative learning groups must be carefully structured and monitored to maximize student involvement and progress in mathematics and science.

APPENDIX II: BIBLIOGRAPHIES*



A. African and African American Contributions to Mathematics

B. African and African American Contributions to Science

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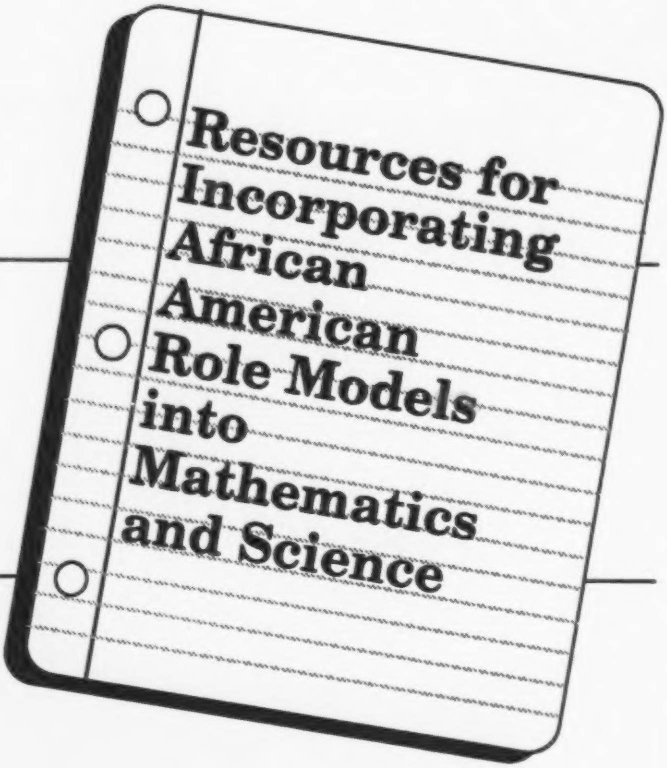
APPENDIX III:



Resources for Incorporating African American Role Models into Mathematics and Science

Although the authors have previewed the majority of materials listed in this guide, the teacher should, whenever possible, preview resources.

RESOURCES FOR INCORPORATING AFRICAN AMERICAN ROLE MODELS INTO MATHEMATICS AND SCIENCE LESSON PLANS

A. ART GALLERIES AND MUSEUMS

1. DISTRICT OF COLUMBIA

- **Anacostia Neighborhood Museum**
  Smithsonian Institution
  1901 Fort Place, S.E.
  Washington, D.C. 20020
  (202) 287-3306

- **Bethune Museum and Archives**
  1318 Vermont Avenue, N.W.
  Washington, D.C. 20005
  (202) 332-1233

- **Howard University Gallery of Art**
  College of Fine Arts
  2455 6th Street, N.W.
  Washington, D.C. 20059
  (202) 806-7070

- **National Museum of African Art**
  Smithsonian Institution
  950 Independence Avenue, S.W.
  Washington, D.C. 20560
  (202) 357-4600

2. MARYLAND

- **Afro-American Heritage Museum**
  Route 2, Box 8
  Indian Head, MD 20640
  (410) 753-6102

- **James E. Lewis Museum of Art**
  Morgan State University
  Coldspring Lane & Hillen Road
  Baltimore, MD 21239
  (410) 444-3030

- **Maryland Commission on Afro-American History and Culture**
  84 Franklin Street
  Annapolis, MD 21401
  (410) 974-2893

- **Maryland Museum of African Art**
  5430 Vantage Point Road
  Columbia, MD 21044
  (410) 730-7105

3. PENNSYLVANIA

- **Afro-American Historical and Cultural Museum**
  701 Arch Street
  Philadelphia, PA 19106
  (215) 574-0380

- **Crispus Attucks Community Center**
  605 South Duke Street
  York, PA 17403

- **Mother Bethel AME Church**
  419 Richard Allen Avenue
  Philadelphia, PA 19147
  (215) 925-0616

4. VIRGINIA

- **Black History Museum and Cultural Center, Inc.**
  Clay Street
  Richmond, VA 23261
  (804) 780-9093

- **Hampton University Museum**
  Hampton, VA 23668
  (804) 727-5308
- **Harrison Heritage and Cultural Center**
  P.O. Box 194
  Roanoke, VA 24002
  (804) 345-4818
- **Task Force on Historic Preservation and the Minority Community**
  12 West Leigh Street
  Richmond, VA 23220
  (804) 788-1709

B. AUDIO-VISUAL MATERIALS

- **African Music — Old and New**
  22 minutes
  Filmfair Communications
  10900 Ventura Blvd., Studio City, CA 91604
  (818) 985-0244
  Traditional African music and influences of Western innovations.
- **Alex Haley: The Search for Roots**
  18 minutes
  Films for the Humanities
  P.O. Box 2053, Princeton, NJ 08543
  (800) 257-5126
  Haley describes how he came to write his book Roots and the unique power it had on the American consciousness.
- **All About Bridges**
  22 minutes
  Rainbow Educational Video
  170 Keyland Court, Bohemia, NY 11716
  (800) 331-4047
  Discusses the history of bridges, their various uses, and the four basic designs (beam, arch, suspension and pontoon).
- **A Place of Rage**
  52 minutes
  Women Make Movies, Inc.
  225 Lafayette Street, Suite 206
  New York, NY 10012
  (212) 925-0606
  This film features a variety of Black women and their achievements, and includes interviews with Angela Davis, June Jordan, Alice Walker, etc.
- **Autobiography of Miss Jane Pittman**
  110 minutes
  Learning Corporation of America
  108 Wilmot Road, Deerfield, IL 60015
  (800) 323-6301
  A 108 year old Black woman recalls her past.
- **Benjamin Banneker: Man of Science**
  9 minutes
  Indiana University, Audio-Visual Center
  Bloomington, IN 47405
  (812)335-2103
  Benjamin Banneker, a Black man living in the 18th century, was a brilliant mathematician and scientist. Banneker used his knowledge to develop an almanac and was a respected member of the world scientific community.
- **Of Black America Series**
  (Five film series)
  BFA Educational Media
  Indiana University, Audio-Visual Services
  Bloomington, IN 47405
  (800) 552-8620
  A mix of torment and achievement describes the situation for Blacks in American history. Role models in the areas of music, athletics, the military, and medicine are presented in the following films:
  - **Black History: Lost, Stolen, or Strayed**
    54 minutes
    Bill Cosby narrates this film which reviews the contributions of Blacks to the development of the United States.

- **The Black Soldier**
  26 minutes
  Narrated by Bill Cosby, this film focuses on the participation of Blacks in America's armed forces. Through drawings, cartoons, etchings of famous battles, and news footage from both World Wars and the Korean and Vietnam Wars, viewers see the valuable contributions Blacks have made in the preservation of America.

- **Body and Soul (Part I)**
  24 minutes
  Harry Reasoner reports on the contributions of Black Americans in sports. Harry Edwards, leader of a threatened Olympic Games boycott, is interviewed along with other Black athletes.

- **Body and Soul (Part II)**
  28 minutes
  Ray Charles narrates the history of the powerful influence of Black Americans on music and dance. The contributions of Billie Holliday, Mahalia Jackson, and Aretha Franklin are discussed.

- **The Heritage of Slavery (Parts I & II)**
  53 minutes
  CBS News reporter George Foster interviews the descendants of plantation owners and present day Black activists, demonstrating the parallels between attitudes under slavery and current perspectives.

- **The Black Athlete**
  28 minutes
  Pennsylvania State University
  Audio-Visual Services
  Special Services Building
  University Park, PA 16802
  (814) 865-6314
  Narrated by James Michener, this film documents the history of Black athletes. In addition to highlighting Joe Lewis, Mohammad Ali, Jesse Owens, Jackie Robinson, Arthur Ashe, Bill Russell, and others, the film examines the risks and the rewards of becoming a professional athlete and the need for an education.

- **The Black G.I.**
  55 minutes
  Indiana University
  Audio-Visual Services
  Bloomington, IN 47405
  (812) 335-2103 or (800) 552-8620
  The Black G.I. examines the discrimination experienced by Black soldiers both on and off U.S. military bases.

- **Black Girl**
  30 minutes
  Extension Media Center,
  University of California,
  2176 Shattack Ave., Berkeley, CA 94704
  (415) 642-0460
  A young woman, Billie Jean, faces family difficulties and her own inner conflicts as she attempts to pursue a career as a ballet dancer. A foster sister provides the encouragement that gives Billie the incentive and strength to follow her dream.

- **Black Has Always Been Beautiful**
  17 minutes
  Indiana University, Audio-Visual Services
  Bloomington, IN 47405
  (812) 335-2103 or (800) 552-8620
  Acclaimed Black photographer James Van der Zee discusses how photographs of Harlem school children, the Black Yankees, and Bill 'Bojangles' Robinson can depict the true history of the Black experience.

- **Black Men and Iron Horses**
  18 minutes
  Labor Institute of Public Affairs
  815 16th Street, N.W. #206
  Washington, D.C. 20006
  (202) 637-5334
  The film focuses on Black inventors and the inventions that helped to improve railroad operations. While railroading benefitted from these developments, most Black workers remained in menial, low-paying jobs. The film also illustrates how Black pullman porters fought bias and won economic justice for all workers.

- **Black Paths of Leadership: Washington, Dubois, and Garvey**
  25 minutes
  Churchill Films, 662 North Robertson Blvd.,
  Los Angeles, CA 90069
  (619) 657-5110
  The lives of Booker T. Washington, W.E.B. DuBois, and Marcus Garvey are chronicled using rare still photographs. The divergent philosophies and legacy of each of these 20th century Black leaders are presented.

- **Black Wings - The American Black in Aviation**
  (Filmstrip, specify secondary or elementary level)
  18 minutes
  National Audiovisual Center
  8700 Edgeworth Drive
  Capitol Heights, MD 20743-3701
  (800) 638-1300
  Blacks in America have struggled against prejudice and discrimination to attain high status within the United States Air Force and in commercial and general aviation. Blacks show how they have established a place for themselves both in aviation history and in the future.

- **Booker T. Washington: The Life and the Legacy**
  32 minutes
  National Archives Trust Fund Board
  National Audiovisual Center
  Customer Service, 8700 Edgeworth Dr.,
  Capitol Heights, MD 20743
  (202) 763-1891
  Booker T. Washington and his contributions to American society come alive through historical dramatizations, photographs, and documentary-style interview segments. Viewers learn about Washington's educational and political career while recognizing his lasting impact on American society.

- **Breaking the Silence: An Introduction to Sound**
  20 minutes
  Rainbow Educational Video
  170 Keyland Court, Bohemia, NY 11716
  (800) 331-4047
  An introduction to, or review of, the concept of sound. Animation and a variety of sounds are used to illustrate what sound waves are and how sound waves travel through the air, the relationship between frequency and pitch, and how the ear functions to enable us to hear. Also provides simple experiments that students can perform at home.

- **A Class Divided**
  54 minutes
  Pennsylvania State University
  Audio Visual Services, Special Services
  Building, University Park, PA 16802
  (814) 865-6314
  This film is an update of the 1970 documentary, The Eye of the Storm. *It examines the long term effects of a 1968 experiment which made children aware of prejudices and stereotypes.*

- **Dance Theater of Harlem**
  60 minutes
  Indiana University, Audio-Visual Services,
  Bloomington, IN 47405
  (812) 335-2103 or (800) 552-8620
  The evolution of the dance company from their early days dancing in a Harlem garage in 1969 to international fame is the focus of the film.

- **Digging for Black Pride**
  19 minutes
  Pennsylvania State University,
  Audio-Visual Services, Special Services
  Building, University Park, PA 16802
  (814) 865-6314
  Children in Brooklyn's Bedford-Stuyvesant section learn about their African heritage through classroom activities and searching for links to their 19th century ancestors at archaeological digs in vacant lots and urban renewal areas.

- **Eyes on the Prize**
  (Video cassette series)
  PBS Video, 1320 Braddock Place
  Alexandria, VA 22314-1698
  (703) 739-5380 or (800) 344-3337
  Available for loan from the Maryland State Department of Education Media Center at (301) 333-2111.
  These documentaries, which record the era of the Civil Rights Movement in the United States, chronicle the period between 1954 and 1963. The films include historical footage and updated interviews with people involved in the desegregation of schools, the Selma to Montgomery March, and the 1963 March on Washington. Six different themes are presented in the following videos: Awakenings, Fighting Back, Ain't Scared Of Your Jails, No Easy Walk, Mississippi, and Bridge to Freedom.

- **The Eye of the Storm**
  5 minutes
  Center for Humanities, 90 S. Bedford Rd.,
  Communications Park, Box 1000
  Mt. Kisco, NY 10549
  (800) 431-1242, in NY (914) 666-4100
  The Eye of the Storm records an Iowa teacher's attempt to introduce her third-grade class to the realities of race and sex exclusion and racial prejudice. (For a follow-up, see A Class Divided).

- **Finding Your Way: Using Maps and Globes**
  20 minutes
  Rainbow Educational Video
  170 Keyland Court, Bohemia, NY 11716
  (800) 331-4047
  Describes the many different uses of maps, such as political maps, road map, topographical and physical maps, and weather maps. Longitude, latitude, equator, hemisphere and Prime Meridian are identified. The importance of understanding the concept of direction and scale in determining distance and the importance of using landmarks and legends as additional tools is explained.

- **Flashettes**
  20 minutes
  New Day Films, 121 West 27th
  Room 902, New York, NY 10001
  (212) 645-8210
  Being part of a winning, Black all-girls' track team in Bedford-Stuyvesent, NY is the theme of this film.

- **Frederick Douglass: an American Life**
  31 minutes
  Three Dimensions Publishing, Inc.
  1015 Stirling Road
  Silver Spring, MD 20901
  (301) 593-6450
  Told in his own words, Frederick Douglass recalls the hardships and triumphs he experienced throughout his life.

- **Futures Unlimited I: Expanding Your Horizons in Mathematics and Science**

  Futures Unlimited II: Expanding Your Horizons in Technical and Vocational Education
  29 min. each
  Consortium for Educational Equity,
  Rutgers-The State University of
  New Jersey, Kilmer Campus 4090,
  New Brunswick, NJ 08903
  (201) 932-2071
  Both videos encourage and support students' desires to pursue mathematics, science, and shop courses to prepare for a future in technological and scientific jobs.

- **Getting to Know Barbara**
  12 minutes
  Carousel Films and Video, 260 5th Ave.,
  Room 705, New York, NY 10001
  (212) 683-1660
  Singled out by former President Ronald Reagan as an example of the best of America's "spirit of enterprise," this determined Black woman rose from poverty to become the owner of a multimillion dollar advertising agency.

- **Great Americans: Martin Luther King, Jr.**
  24 minutes
  EBE Preview and Rental Service,
  Encyclopedia Britannica
  Educational Corporation,
  310 S. Michigan Ave., Chicago, IL 60604
  (312) 347-7007
  In this film, three of Dr. King's closest friends and Coretta Scott King present assessments of Martin Luther King, Jr.'s leadership in the Civil Rights Movement. Using documentary footage and photographs, the film analyzes Dr. King's philosophy of non-violence, marking and affirming his influence on civil rights in the United States and the world. A discussion guide accompanies the film.

- **Hannah and the Dog Ghost**
  30 minutes
  Phoenix Films and Video, Inc.
  468 Park Avenue, New York, NY 10016
  (800) 221-1274
  A scary tale from Afro-American folklore is told.

- **Hot Line: All About Electricity**
  15 minutes
  Rainbow Educational Video
  170 Keyland Court, Bohemia, NY 11716
  (800) 331-4047
  Through simple experiments, students discover a great deal about the properties of electricity. They learn about static electricity, electrons, negative and positive charges, current electricity, circuits, and the function of power lines.

- **Identifying Racism in Children's Books**

  Identifying Sexism in Children's Books
  (Filmstrips and audio cassettes)
  14 minutes
  Council on Interracial Books for
  Children, Racism/Sexism Resource
  Center
  1841 Broadway, New York, NY 10023-7648
  (212) 757-5339
  These filmstrips demonstrate both the obvious and subtle ways in which racist and sexist messages are transmitted to children through the books they read. By offering useful criteria for identifying race and gender stereotyping, the filmstrips help educators and parents sharpen their skills in selecting books with positive values and role models.

- **I Is a Long-Memoried Woman**
  50 minutes
  Women Make Movies, Inc.
  225 Lafayette Street, Suite 206
  New York, NY 10012
  (212) 925-0606
  This video details the history of slavery through the eyes of Caribbean women. It includes a combination of monologue, dance, and song.

- **Jan Matzeliger: The Lasting Machine**
  5 minutes
  Three Dimensional Publishing, Inc.
  1015 Stirling Road, Silver Spring, MD 20901
  (301) 593-6450
  This is the story of the Black inventor who revolutionized the shoe industry with the hand process lasting machine.

- **Jesse Jackson and Carolyn Shelton: Pushing for Excellence**
  16 minutes
  BFA Educational Media
  Indiana University, Audio-Visual Center
  Bloomington, IN 47405
  (812) 337-2103
  Reverend Jesse Jackson believes that excellence in schools is a prerequisite for minority success. Shelton, a young Black flight attendant, brings a similar message to minority girls. This film focuses on the determination and pride which can help minorities transform their schools and careers.

- **Just Between Sisters**
  29 minutes
  Consortium for Educational Equity, Rutgers-The State University of New Jersey, Kilmer Campus 4090
  New Brunswick, NJ 08903
  (201) 932-2071
  A multimedia package highlights nontraditional, technical careers of Black and Hispanic women. These role models provide guidance for young adults looking at careers in nontraditional professions.

- **Lewis Temple and the Hunting of the Whale**
  5 minutes
  Three Dimensional Publishing, Inc.
  1015 Stirling Road, Silver Spring, MD 20901
  (301) 593-6450
  Lewis Temple designed a new type of harpoon, the Temple Targon Iron, that was greatly needed by the whaling industry during the first half of the 19th Century.

- **The Life of Fannie Lou Hamer: Never Turn Back**
  60 minutes
  Rediscovery Productions, Inc.
  2 Halfmile Common, Westport, CT 06880
  (203) 227-2268
  Fannie Lou Hamer, a civil rights activist who founded the Mississippi Freedom Democratic Party and organized voter registration campaigns in the South during the 1960's, is interviewed in this film. She emerges as a powerful woman who stresses the need for involvement in social issues.

- **Lorraine Hansberry: The Black Experience in the Creation of Drama**
  35 minutes
  Films for the Humanities
  P.O. Box 2053, Princeton, NJ 08543
  (800) 257-5126
  Lorraine Hansberry narrates this film which uses excerpts from her works, The Sign in Sidney Brustein's Window and A Raisin in the Sun, to show the incorporation of the Black experience into the artistic development of drama.

- **Malcolm X**
  23 minutes
  Carousel Films and Video, 260 5th Ave., Room 705, New York, NY 10001
  (212) 683-1660
  This film reviews the different roles that Malcolm X played in his struggle for Black equality in the 1960's.

- **Mary Lou Williams: Music on My Mind**
  60 minutes
  Women Make Movies, Inc.
  225 Lafayette Street, Suite 206
  New York, NY 10012
  (212) 925-0606
  A tribute to Mary Lou Williams, one of the most remarkable figures in the history of jazz music. This film includes interviews with several other jazz musicians, such as Dizzy Gillespie and Buddy Tate.

- **Mary McLeod Bethune**
  29 minutes
  Sylvester C. Watkins, 5720 P6A, #513
  Orlando, FL 32809
  (407) 345-8963
  This film traces the life and accomplishments of educator and activist Mary McLeod Bethune.

- **The Math and Science Connection: Educating Young Women for Today**
  17 minutes
  Education Development Center
  WEEAP Distribution Center
  39 Chapel Street, Newton, MA 02160
  (800) 225-4276,
  in MA (617) 969-7100 ext. 348
  Designed to encourage girls and young women to prepare for careers in mathematics and science, this film presents successful model programs. The film also describes the reasons for and consequences of women's unequal participation in math and science related fields.

- **Dr. Martin Luther King, Jr. . . . an Amazing Grace**
  62 minutes
  Indiana University, Audio-Visual Center, Bloomington, IN 47405
  (812) 335-2103 or (800) 552-8620
  This film highlights the significant events of the Civil Rights Movement in which Dr. King's speeches provided inspiration and motivation. There is news footage of major events, including the 1955 bus boycott in Montgomery, Alabama; the 1963 March on Washington; and the 1967 speech against American involvement in Vietnam.

- **Miles of Smiles, Years of Struggle: The Untold Story of Black Pullman Porters**
  59 minutes
  Labor Institute of Public Affairs
  815 16th Street, N.W.,
  Washington, D.C. 20036
  (202) 637-5334
  The story describes the pullman porters' struggle to unionize. The film focuses on the history of the Pullman Company, the porters' job, and the impact that the porters' Black trade union had on the Civil Rights Movement.

- **New Mood**
  30 minutes
  Indiana University, Audio-Visual Center, Bloomington, IN 47405
  (812) 335-2103 or (800) 552-8620
  New Mood *records the civil rights struggle of Blacks and the impact of Black militancy on both White and Black Americans. Also discussed is the impact of the 1954 Supreme Court decision repudiating the doctrine of 'separate but equal' facilities in public schools and elsewhere.*

- **Nothing but Options**
  18 minutes
  Math Science Network
  2727 College Ave., Berkeley, CA 94705
  (415) 841-MATH
  Nothing but Options *provides information and encouragement from articulate role models for teenage women who want to pursue careers in the mathematics and science fields.*

- **Only the Ball Was White**
  30 minutes
  Films, Inc., 5547 N. Ravenswood Avenue, Chicago, IL. 60640-1199
  (800) 323-4222
  These historic film clips and personal interviews describe the era when professional sports teams were segregated by race.

- **Opening the Doors**
  40 minutes
  Central Regional Center for Vocational Equity, 10598 Marble Faun Court
  Columbia, MD 21044
  (410) 740-3316
  Opening the Doors *presents the advantages of nontraditional careers through biographical sketches of a deaf female dyemaker, a male nurse in a shock trauma unit, and a Black female television technician. The film takes a positive look at the nontraditional careers available in both today's job market and in the future.*

- **Out of Darkness: An Introduction to Light**
  20 minutes
  Rainbow Educational Video
  170 Keyland Court, Bohemia, NY 11716
  (800) 331-4047
  The major topics concerning light are explored such as reflection, refraction, the spectrum, the speed of light, and how sunlight has energy. Students learn how prisms and different types of lens work.

- **Plants: Green, Growing, Giving Life**
  22 minutes
  Rainbow Educational Video
  170 Keyland Court, Bohemia, NY 11716
  (800) 331-4047
  This video investigates the role of plants in the environment and food chain. The various parts of the plant are shown and their role in keeping the plant alive are explained.

- **Portrait in Black: A. Phillip Randolph**
  10 minutes
  Rediscovery Productions, Inc.
  2 Halfmile Common, Westport, CT 06880
  (203) 227-2268
  Through an interview, A. Phillip Randolph, the distinguished Civil Rights leader and former president of The Brotherhood of Sleeping Car Porters, discusses his long crusade for Black equality.
- **Prophet of Peace: The Story of Dr. Martin Luther King, Jr.**
  23 minutes
  University of California, Extension
  Media Center, 2176 Shattack Avenue
  Berkeley, CA 94704
  (415) 642-1340
  Through the eyes of a child, we see the animated biography of the great Civil Rights leader, Dr. Martin Luther King, Jr. The film includes excerpts from two of Dr. King's most celebrated speeches.
- **Rain or Shine: Understanding the Weather**
  15 minutes
  Rainbow Educational Video
  170 Keyland Court, Bohemia, NY 11716
  (800) 331-4047
  Graphics and animation are used to explain the weather. Topics covered include atmospheric heating, cool and warm air masses, barometers, significance of clouds, cold and warm fronts, and how bits of information are used to make predictions about the weather.
- **Roy Wilkins: The Right to Dignity**
  20 minutes
  Carousel Films and Video, 260 5th Ave., Room 705, New York, NY 10016
  (212) 683-1660
  Sidney Poitier narrates a film recounting the Civil Rights Movement from the turn of the century to the present. The film features the humble beginnings of Roy Wilkins, director of the National Association for the Advancement of Colored People (NAACP), and presents historical material of rare photographs and stock footage not previously seen.
- **Spaces**
  Six 30-minute video cassettes
  GPN, P.O. Box 80669, Lincoln, NE 68501
  (402) 472-2007 or (800) 228-4630
  Produced for public television, Spaces focuses on motivating minority children and encouraging them to select careers in science and technology. The series highlights the scientific accomplishments of Blacks, Hispanics, Asians, and Native Americans, while demonstrating the importance of science and technology in our daily lives. A teacher's guide with suggested classroom activities, a detailed science career index and student viewing sheets accompany the videotapes.
- **Spirit to Spirit: Nikki Giovanni**
  30 minutes
  Direct Cinema Limited, P.O. Box 69799
  Los Angeles, CA 90069
  (213) 652-8000
  This film examines the work of poet Nikki Giovanni, the themes of the Civil Rights Movement, and the Women's Movement as expressed in her poems.
- **Sylvia: Summer Before College**
  30 minutes
  Pennsylvania State University
  Audio-Visual Services, Special Services Building, University Park, PA 16802
  (814) 865-6314
  The life of a Black teenage girl, Sylvia Porter, is documented in this film. The focus is on the summer prior to her entering college. At this critical time, Sylvia assesses her priorities and realizes that she can have a great deal without having to have it all.

- **"There Was Always Sun Shining Someplace": Life in the Negro Baseball Leagues**
  58 minutes
  Pennsylvania State University
  Audio-Visual Services, Special Services Building, University Park, PA 16802
  (814) 865-6314
  Prior to 1947 when Jackie Robinson integrated the major leagues, the Negro Baseball Leagues flourished. This film covers the history of those times, presenting rare historical footage of ballplayers traveling the roads of America, the Caribbean and Latin America. Interviews are conducted with such notables as Satchel Paige and James "Cool Papa" Bell.

- **Visions of the Spirit: a Portrait of Alice Walker**
  58 minutes
  Women Make Movies, Inc.
  225 Lafayette Street, Suite 206
  New York, NY 10012
  (212) 925-0606
  An intimate and inspiring portrait of Pulitzer Prize Winning author Alice Walker. This film also includes on-location footage with the film crew of The Color Purple.

- **Walk Through the 20th Century with Bill Moyers: the Second American Revolution**
  56 minutes
  Pennsylvania State University
  Audio-Visual Services, Special Services Building, University Park, PA 16802
  (814) 865-6314
  Ossie Davis and Ruby Dee give their perspective on the Black American struggle to achieve equality under the law. The film deals with specific incidents such as the Plessy v. Ferguson decision, the role of Blacks in World War I, the Niagara Movement, and the Harlem Renaissance.

- **Walk Through the 20th Century with Bill Moyers: the Second American Revolution Part II**
  53 minutes
  Pennsylvania State University
  Audio-Visual Services, Special Services Building, University Park, PA 16802
  (814) 865-6314
  Ossie Davis and Ruby Dee again narrate the struggle of Blacks to achieve equality under the law in this segment dealing with the years from 1930 to 1983. While desegregation in education and the legislative triumphs of the Civil Rights Movement are featured, the film concludes that the United States remains a divided country.

- **What's Out There?: Exploring the Solar System**
  15 minutes
  Rainbow Educational Video
  170 Keyland Court, Bohemia, NY 11716
  (800) 331-4047
  Our everchanging knowledge and understanding of the universe and solar system are described throughout the ages, from the early ideas of Ptolemy, Galileo, Copernicus, and Newton to the Space Age.

- **Winning "Justice for All"**
  35 minutes
  Council on Interracial Books for Children,
  CIBC Resource Center, Room 300
  1841 Broadway, New York, NY 10023
  (212) 757-5339
  This program presents a curricular unit for grades five and six on racism and sexism in business, schools, government, literature, and the media.

- **Women in Science**
  30 min. ea.
  Agency for Instructional Technology
  Box A, Bloomington, IN 47402-0120
  (812) 339-2203
  (800) 457-4509
  Women in Science is an eight-part video series designed to motivate junior high,

high school, and adult women to pursue careers in the sciences. Helping women to see themselves as scientists and engineers, through interviews with dozens of successful women, the video offers practical advice about how to overcome barriers to achievement in these fields. The series reaches women at a critical juncture in their course and career decision-making processes.

- **You Can Be a Scientist, Too**
  13 minutes
  Cally Curtis Company
  1111 N. Las Palmas Avenue
  Hollywood, CA 90038-1289
  (213) 467-1101
  You Can Be a Scientist, Too *encourages children's interest in science and explores activities that can lead to scientific careers.*

C. CALENDARS

- ***Aetna Calender***
  Corporate Affairs, RWAC
  151 Farmington Avenue
  Hartford, CT 06156-3220
  Published annually, for $2.00 per copy, salutes the contributions of Black Americans. A teacher's guide is also available free of charge.

- ***Black Kings and Queens of Africa Calendar***
  Great Kings & Queens of Africa
  c/o NOW Services
  P.O. Box 932392
  Atlanta, GA 30377-0292
  (800) 833-4688
  Published annually, for $3.00 per copy, features historical information on Black kings and queens of Africa.

- ***Calendar of Black Children***
  National Black Child Development Institute
  1023 15th Street, N.W.
  Washington, D.C. 20005
  (202) 387-1281
  Published annually for $6.00 per copy, features photographs of Black children accompanied by poetry. Monthly calendar with designated Black history information.

(Review Black magazines between November and February; several ads will be posted with offers for Black History/ Experience calendars)

D. FIELD TRIPS AND LANDMARKS TO VISIT

There are a number of African American landmarks throughout the United States. Listed below are only those in the mid-Atlantic region. For a complete list, contact the National Park Service at (202) 208-3100, and ask for:

Catalogue of National Historic Landmarks.
Compiled in the History Division, National Park Service. Washington, D.C.: U.S. Department of the Interior, 1986.

1. DELAWARE LANDMARKS

- **DOVER: Delaware State College**
  Founded in 1890 as a college for Black Americans
- **DOVER: John Dickinson House**
  A house used on the Harriet Tubman's route in the "Underground Railroad".
- **DOVER: Woodburn Mansion (The Governor's House)**
  This mansion was also used as an "Underground Railroad" station before the Civil War.

- **WILMINGTON: Afro-American Historical Society of Delaware**
  Formed in 1986, this society has pledged to initiate activities relating to Black history. Check with the Society for upcoming events.
- **WILMINGTON: Asbury Methodist Episcopal Church**
  Legend has it that the town's leading citizens, who considered Methodism beneath them socially, were extremely impressed with the sermon given on the occasion they stood outside the church, intending to listen to Asbury preach. The sermon was not delivered by the bishop but by his Black servant, Harry.
- **WILMINGTON: Cradle of African-American Political Leadership**
  This monument commemorates many Black political leaders of the 20th century.

2. DISTRICT OF COLUMBIA LANDMARKS

- **Association for the Study of Afro-American Life and History**
  Founded by Carter Woodson to preserve the historical record of the Negro in American life.
- **Birthplace of Edward Kennedy "Duke" Ellington**
  On 1212 T Street, N.W. stands the building in which Duke Ellington was born on April 29, 1899. Ellington was one of the greatest jazz musicians and composers.
- **Cedar Hill, Frederick Douglass' Home**
  Located at 316 A Street, N.E. is the 20-room Victorian home where Frederick Douglass lived during the last 13 years of his life.
- **Charles Sumner School**
  Located at 1201 17th Street, this school was built to educate Black youth in 1871. The first all Black high school graduation was held here in 1877.
- **Emancipation Statue, Lincoln Park**
  Former Black slaves were responsible for financing and erecting the oldest memorial to Abraham Lincoln in the Washington, D.C. area. Dedicated on April 14, 1876, it depicts Lincoln breaking slavery's chains.
- **Evans-Tibbs Collection**
  Located at 1910 Vermont Avenue, this historic house holds a Black American art museum.
- **Howard University**
  Founded in 1867, Howard University is the largest institution of higher learning for Black Americans. The 50 acre campus grounds are valued at more than 40 million dollars. The Founders Library, with over 300,000 volumes, is one of the finest collections on Black history in the United States.
- **Lincoln Memorial, Memorial Circle**
  This has been the site of several events underscoring Blacks' quest for dignity and the struggle for opportunity.
- **Mary McLeod Bethune Memorial**
  Unveiled in 1974, this is the first monument dedicated to a Black person, or a woman, erected on public land in the nation's capital. The monument is located in Lincoln Park.
- **The Phillips Gallery**
  Thirty pieces out of Jacob Lawrence's famous 60-panel study on Black migration in America are housed in this gallery.
- **Roosevelt Island**
  In 1863, Black Civil War soldiers were recruited and trained at a camp on Anolostin Island. (Later, this island was renamed Roosevelt Island.)
- **Tidal Basin Bridge**
  This bridge was built by Archie A. Alexander, a famous Black engineer.

SUGGESTED FIELD TRIPS —
Call for events and schedules.

a. **Anacostia Neighborhood Museum**
Smithsonian Institution
1901 Fort Place, S.E.
Washington, D.C. 20020
(202) 287-3369

b. **Library of Congress**
1st & Independence Avenue, S.E.
Washington, D.C. 20540
(202) 707-5000

c. **Museum of African Art**
950 Independence Avenue, S.W.
Washington, D.C. 20560
(202) 357-4600

3. MARYLAND LANDMARKS

- **ANNAPOLIS: Matthew Henson Plaque**
The Matthew Henson Plaque honors the memory of the only man to accompany Admiral Robert E. Peary on all of his polar expeditions.
- **BALTIMORE: Beulah M. Davis Special Collections Room**
Morgan State University has a collection of artifacts on Benjamin Banneker, Frederick Douglass, and Matthew Henson.
- **BALTIMORE: Eubie Blake Cultural Center**
This museum houses the great composer's memorabilia.
- **BALTIMORE: Great Blacks in Wax Museum**
This museum features over 100 life-size figures of Black American athletes, entertainers, and politicians.
- **BALTIMORE COUNTY: Benjamin Banneker Marker**
This marker, located on Westchester Avenue at Westchester School, is a tribute to Benjamin Banneker, the Black mathematician, astronomer, and inventor.
- **DORCHESTER COUNTY: Harriet Tubman Marker**
This marker, located on Greenbriar Road, indicates the birthplace of Harriet Tubman, known as the "Moses of Her People."
- **ROCKVILLE: Uncle Tom's Cabin**
Site of the log cabin believed to be the birthplace of Josiah Henson, the slave immortalized as Uncle Tom in Harriet Beacher Stowe's famous abolitionist study, *Uncle Tom's Cabin.*
- **SHARPESBURG: Antietam Battlefield**
This was the site of a crucial battle during the Civil War which stopped General Lee's invasion of the North. Blacks were employed by the quartermaster departments of both armies. President Lincoln used the Antietam Victory to announce the Emancipation Proclamation on September 22, 1862.

SUGGESTED FIELD TRIPS:

a. **African American Heritage Society**
3344 Dolfield Avenue
Baltimore, MD 21215
(410) 367-6291

b. **Banneker-Douglass Museum of Afro-American Life and History**
84 Franklin Street
Annapolis, MD 21401
(410) 974-2893

4. PENNSYLVANIA LANDMARKS

- **ERIE: Harry T. Burleigh Birthplace Marker**
A friend of the Czech composer Dvorak, and a composer himself, Burleigh was born in 1866. He set to music many poems by Walt Whitman and arranged spirituals such as "Deep River".

- **GETTYSBURG: The Lincoln Room Museum at the Wills House**
  President Lincoln completed the Gettysburg Address here in 1862.
- **LANCASTER: Thaddeus Steven's Gravesite**
  Thaddeus Stevens, a White abolitionist and civil rights activist, is buried in a cemetery for Blacks in Schreinors Cemetery. In his will, he rejected burial in a White cemetery because of the segregation policy.
- **LOWER MERION TOWNSHIP: James A. Bland Grave**
  The grave of the Black composer, James A. Bland, who wrote the state song of Virginia, lies in Montgomery County.
- **PHILADELPHIA: Afro-American Historical and Cultural Museum**
  This museum offers the "Afro-American Heritage Tour of Philadelphia".
- **PHILADELPHIA: All-Wars Memorial to Black Soldiers**
  The monument was erected in 1934 to pay tribute to Black soldiers from Pennsylvania who died in battle.
- **PHILADELPHIA: The Philadelphia Tribune**
  One of the nation's oldest Black-owned newspapers, it was founded in 1884.
- **VALLEY FORGE: George Washington Carver Community Center**
  This center houses comprehensive information on Black contributions to American culture.

5. VIRGINIA LANDMARKS

- **ALEXANDRIA: The Alexandria Black History Resource Center**
  This Black History Museum was founded in 1983.
- **ARLINGTON: Charles Richard Drew House**
  Located at 2505 First Street South, this was the home of Charles Richard Drew, the noted black physician.
- **CAPAHOSIC: Holley Knoll (Robert R. Morton House)**
  The retirement home of Robert R. Morton who succeeded Booker T. Washington as head of Tuskegee Institute in 1915.
- **HAMPTON: Fort Monroe**
  Fort Monroe was one of the few military posts not seized by the Confederacy at the outbreak of the Civil War. It became a haven for fugitive Blacks escaping to the Union line.
- **HAMPTON: Hampton University**
  Hampton University is one of the earliest institutions of higher learning for Blacks. Booker T. Washington attended Hampton University and taught here before he founded Tuskegee Institute.
- **RICHMOND: Jackson Ward Historic District**
  The foremost African American historic district in the 19th and early 20th centuries. This area was an early center for African American banking, ethnic, and social organizations.
- **RICHMOND: Maggie Walker House**
  The home of the first Black bank president in the United States.
- **ROCKY MOUNT: Booker T. Washington National Monument**
  This was the Burroughs Plantation on which Booker T. Washington was born a slave in 1856.
- **WILLIAMSBURG: Colonial Williamsburg**
  "The Other Half" is a tour which highlights the culture, history, and life of Black Americans in the newly formed colonies.

SUGGESTED FIELD TRIPS

a. **Museum of the Confederacy**
1201 East Clay Street
Richmond, VA 23219
(804) 649-1861

2. **Plantations:**
    - i. Ashlawn — Charlottesville, VA
      (804) 293-9539
    - ii. Monticello — Charlottesville, VA
      (804) 295-8181
    - iii. Mount Vernon — Mt. Vernon, VA
      (703) 780-2000
    - iv. Oatlands — Leesburg, VA
      (703) 777-3174
    - v. Sully Plantation — Chantilly, VA
      (703) 437-1794

NOTE: Most of these plantations no longer have slave quarters. It would be appropriate to discuss with the students who lived where and what kinds of conditions existed for the slaves.

6. WEST VIRGINIA LANDMARKS

- **CHARLESTOWN: Jefferson County Courthouse**
  Contains the room where John Brown was tried and sentenced to hang in 1859.
- **HARPER'S FERRY: John Brown Story Museum**
  Located at the junction of Maryland, Virginia, and West Virginia, this is the site of John Brown's raid on the federal arsenal in 1859.
- **MALDEN: Booker T. Washington Monument**
  This monument was erected in 1963 to mark the site where Booker T. Washington, the founder of the Tuskegee Institute, lived for many years.

7. SPECIAL ANNUAL FIELD TRIP:

This field trip usually coincides with Black History Month.

ESCAPE TO FREEDOM: a dramatization recreating the experience of the Underground Railroad, departing from Washington, D.C. to various nearby sites, such as Harper's Ferry, WV, Philadelphia, PA, and Gettysburg, PA. Contact:

Ideal Learning Center
1501 Gallatin Street, N.W.
Washington, D.C. 20011
(202) 726-0313

E. GALLERIES AND SHOPS

(Visit and Request Catalogues)

- **African Fashions and Cultural Store**
  2140 Harford Road
  Baltimore, MD 21218
  (410) 243-5004
  Cultural items from Africa, the Caribbean, and America including fabric, clothing, jewelry, sculptures, books, posters, and African musical instruments.
- **Brown Spices**
  Julee Designs
  P.O. Box 29397
  Washington, D.C. 20017
  (202) 269-3067
  Soft Sculpture and Doll Collection, Graphics and Illustrations, and Children's Books by Julee Dickerson Thompson.
- **Claudia's Caravan**
  P.O. Box 1582
  Alameda, CA 94501
  (415) 521-7871
  Multicultural resources including books, filmstrips, games, and records.
- **Duke Ellington Art Students**
  c/o Cathy Conn
  35th and R Streets, N.W.
  Washington, D.C.
  (202) 282-0123
- **Gryphon House**
  P.O. Box 275
  Mt. Ranier, MD 20712
  (800) 638-0928
  Multicultural children's books.

- **Junior Editions**
  2048 Columbia Mall
  Columbia, MD 21044
  (410) 730-2665
  Children's bookstore ranging from books for infants to 14 years of age.
- **The Martin Luther King, Jr. Center for Nonviolent Social Change**
  449 Auburn Avenue, N.E.
  Atlanta, GA 30312
  (404) 524-1956
  Books, mugs, posters, etc. depicting the life and legacy of Dr. Martin Luther King.
- **Nomad**
  2407 18th Street, N.W.
  Washington, D.C. 20009
  (202) 332-2998
  African and Moroccan textiles, jewelry, clothing, masks, and ceremonial and tribal pieces.
- **Pyramid Bookstore**
  2849 Georgia Ave.
  Washington, D.C. 20001
  (202) 328-0190
  Cassette tapes of historical speeches, books, posters, and periodicals.
- **Sun Galleries**
  25 Yost Place, Addison Plaza
  Capitol Heights, MD 20742
  (301) 499-8704
  African and Black American art, sculpture, batik, prints, posters, and custom framing.
- **Timboktu**
  1548 Benning Road, N.E.
  Washington, D.C. 20002
  (202) 397-2020
  African artifacts, books, and clothing.

F. GAMES

- ***All Aboard for Black History***
  Media Materials
  1821 Portal Street
  Baltimore, MD 21224
  Includes 5 individually boxed, 30-minute games: Famous Firsts, Ingenious Inventors, Women With A Message, and King For A Day I & II; including 10 formal lessons based on biographical sketches of important people.
- ***BlacFax***
  Farrar and Associates
  Independent Distributors
  P.O. Box 47179
  Forestville, MD 20747
  Provides 3,000 Black culture questions to be played independently or used in combination with other trivia games. There are 6 color-coded categories related to Black culture, history, business, entertainment, sports literature, art, and potpourri.
- ***Black History***
  Afro-Am Distributing Company
  819 S. Wabash Avenue
  Chicago, IL 60605
  A set of 6 mini-plays providing an overview of Black history: Harriet Tubman, James Rapier, Booker T. Washington, Martin Luther King, Jr., W.E.B. DuBois, and Protests of the 60's.
- ***Black History Playing Card Deck***
  U.S. Game Systems, Inc.
  Stamford, CT 06902
  Features 52 portraits and biographies of notable Black persons in American history.
- ***Black Quest***
  BLB Enterprise, Inc.
  2025 Eye Street, N.W., Suite 204
  Washington, D.C. 20012
  Provides a focus on the history of the Black experience in America in the form of a trivia game to encourage players' discussion, debate, and further "quest" for Black history information.

- ***Brown Spices: ABC Coloring Book***
  By Annie Julee
  Brown Spices Publishing Company
  P.O. Box 29397
  Washington, D.C. 20017
  A 26-page coloring book covering the worldwide African diaspora.
- ***Family Treedition***
  P.O. Box 2566
  Washington, D.C. 20013
  The object is to build as many family relations as possible from great-grandmother to third cousins. The game plan is to unscramble who is related to whom and how.
- ***Forty Famous Black Americans: Picture, Biography, and Quiz Cards***
  Media Materials
  1821 Portal Street
  Baltimore, MD 21224
  Provides pictures, biographies, and questions on famous Black Americans and their contributions to the United States.
- ***Harriet Tubman Game and Study Set***
  National Women's History Project
  7738 Bell Road
  Windsor, CA 95492
  Explores the life of Harriet Tubman with a game board of her route along the "Underground Railroad", 2-page biography, discussion questions, song sheet, activity suggestions, and bibliography of related sources.
- ***High Achiever***
  En-Lite Enterprise
  P.O. Box 392-E
  Newbury Park, CA 91320
  A Black history trivia game.
- ***Identity***
  Eboni Corner
  255 Murtland Avenue
  Washington, PA 15301
  A Black heritage game for the whole family. Recommended for ages 8 and older.
- ***Rise n' Fly***
  P.O. Box 200
  Rockland, DE 19732
  Combining the elements of Bid Whist and Trivia, this game is based on one's confidence in the ability to answer questions in 4 areas of Black heritage.
- ***Synergy***
  SYNERGY
  P.O. Box 17105
  Pittsburgh, PA 15235
  A trivia and team-building game designed for the whole family.

G. INSTRUCTIONAL AIDS

- **African-American Literature Service**
  5430 F Lynx Lane, Suite 132
  Columbia, MD 21044
  (410) 964-6451
  Books by and about African Americans.
- **Afro-American Book Source**
  P.O. Box 851
  Boston, MA 02120
  (617) 445-9209
  Books by and about African Americans.
- **Afro-American Catalog**
  Afro-Am Distributing Company
  407 East 25th Street, Suite 600
  Chicago, IL 60616
  (312) 791-1611
  Lists Black-oriented books, filmstrips, records, and other materials.
- **Afro-American Communities Project**
  National Museum of American History
  Archives Center, Smithsonian Institution
  Washington, D.C. 20560
  (202) 357-3182
  A database on free Blacks in the antebellum North, including books and articles.

- **Afro-American Resource Center**
  P.O. Box 746
  Howard University
  Washington, D.C. 20059
  (202) 806-7242
  Books, tapes, films and records for university community and general public.
- **Afro-Hispanic Institute**
  3306 Ross Place, N.W.
  Washington, D.C. 20008
  (202) 966-7783
  Afro-Hispanic research, literature, and cultural materials.
- **Association of Black Women Historians**
  5484 Sleeping Dog Lane
  Columbia, MD 21045
  (301) 730-4296
  Resources on Black women in history.
- **Association for the Study of Afro-American Life and History**
  1407 14th Street, N.W.
  Washington, D.C. 20005-3704
  (202) 667-2822
  Journals, bulletins, historical research, catalogues, posters, photography library, and materials for Black History Month.
- **Associated Publishers, Inc.**
  1407 14th Street, N.W.
  Washington, D.C. 20005
  (202) 667-2822
  An agency of the Association for the Study of Afro-American Life and History.
- **Center for the Study of Black Literature and Culture**
  University of Pennsylvania
  3808 Walnut Street
  Philadelphia, PA 19104-6136
  (215) 898-3699
  Lecture series and various programs, including Afro-American history and literature curriculum development.
- **Council on Interracial Books for Children**
  Racism and Sexism Resource Center
  1841 Broadway, Suite 608
  New York, NY 10023
  (212) 757-5339
  Lists multicultural filmstrips, books and lesson plans.
- **Educational Materials Services Center (EMSC)**
  Multicultural Materials Catalog
  144 Railroad Avenue, Suite 107
  Edmonds, WA 98020
  (206) 775-3582
  Literature, filmstrips, and simulation games for children and young adults, professional books, and the "Multicultural Leader Newsletter".
- **Empak Publishing Company**
  212 East Ohio Street
  Chicago, IL 60611
  (800) 477-4554
  Posters, Black history booklets, activity and resource guides and kits, T-shirts and sweatshirts.
- **Global Village Books and Toys**
  2210 Wilshire Boulevard
  P.O. Box 262
  Santa Monica, CA 90403
  (213) 459-5188
  Anti-bias products for children, educators, and parents.
- **Hayes School Publishing Co., Inc.**
  321 Pennwood Avenue
  Wilkinsburg, PA 15221
  (412) 731-4693
  Poster series entitled Famous 20th Century Black Americans and The Black American Achievements Posters.
- **Intercultural Press, Inc.**
  P.O. Box 700
  Yarmouth, ME 04096
  (207) 846-5168
  Publications and videos on topics ranging from multicultural education to understanding cultural differences.

- **Know, Inc.**
  P.O. Box 86031
  Pittsburgh, PA 15221-0031
  (412) 241-4844
  Resource lists, bibliographies, curriculum materials, and practical guides for the classroom.

- **Learn Me Store**
  175 Ash Street
  St. Paul, MN 55126
  (612) 490-1805
  Elementary level multicultural trade books and records from several publishers.

- **Maryland Commission on Afro-American History and Culture**
  84 Franklin Street
  Annapolis, MD 21401
  (410) 269-2893

- **McDonald's Educational Resource Center**
  P.O. Box 8002
  3620 Swenson Avenue
  St. Charles, IL. 60174-8002
  (800) 627-7646
  Educational materials including *"A Salute to Black Inventors" and "Happy Birthday Dr. King."*

- **Media Materials**
  Department 910301
  1821 Portal Street
  Baltimore, MD 21224
  (410) 633-0730
  Curriculum materials, games, and videos for the classroom.

- **Multi-Media Education Distributors Catalog**
  "Black and Multi-Ethnic Awareness Catalogue"
  19363 Livernois
  Detroit, MI 48221
  (800) 342-1261
  List of Black-oriented books, records, and other curriculum materials.

- **National Alliance of Black School Educators, Inc.**
  2816 Georgia Avenue, N.W., Suite 2
  Washington, D.C. 20001
  (202) 483-1549
  Information on improving educational achievement, experiences, and opportunity for Black youths and adults.

- **National Archives for Black Women in History**
  Bethune Museum and Archives
  1318 Vermont Avenue, N.W.
  Washington, D.C. 20005
  (202) 332-1233
  Personal papers, organizational records, and other materials of Black women.

- **National Black Childe Development Institute, Inc.**
  1023 15th Street, N.W.
  Washington, D.C. 20005
  (202) 387-1281
  Lists of resources and publications on Black child development and education.

- **National Institute for Women of Color**
  1301 20th Street, N.W., Suite 702
  Washington, D.C. 20036
  (202) 296-2661
  Communication network with particular focus on economic and educational equity.

- **National Women's History Project**
  7738 Bell Road
  Windsor, CA 95492-8515
  (707) 838-6000
  Resources, training, and a catalog of multicultural books, curriculum guides, calendars, and audio visual materials.

- **Rainbow Educational Video**
  170 Keyland Court
  Bohemia, NY 11716
  (800) 331-4047
  Videos catalog with textbook correlations.

- **Shomburg Center for Research in Black Culture**
  New York Public Library
  35th Street and Malcolm X Boulevard
  New York, NY 10037
  (212) 491-2200
  Considered one of the best sources of information on Black history and culture.

- **Three Dimensional Publishing, Inc.**
  1015 Stirling Road
  Silver Spring, MD 20901
  (301) 593-6450
  African American Inventors Series *– 39 posters and user's guide and educational audiovisual materials.*

- **Women of Color Press**
  P.O. Box 908
  Lathan, NY 12110
  (518) 434-2057
  Cultural and historic resources on Black women.

H. LIBRARIES

1. DELAWARE

- **William Jason Library Learning Center**
  Delaware State College
  Dover, DE 19901
  (302) 739-5111
  Serials and periodicals related to Black studies; a collection of Black History resources, as well as fiction and nonfiction literature are available.

2. DISTRICT OF COLUMBIA

- **Martin Luther King, Jr. Library**
  901 G Place, N.W.
  Washington, D.C. 20001
  (202) 727-1211
  (Black Studies Division, Room 110)
  A collection of current and historical works by and about African American people. All the materials in this division are reference works and are not circulated.

- **Moorland-Spingarn Research Center**
  Howard University
  500 Howard Place, N.W.
  Washington, D.C. 20059
  (202) 806-7260

  The world's largest and most comprehensive repository of the history and culture of Black people in Africa, Latin America, the Caribbean, and the United States.

- **United States Library of Congress**
  First Street and Independence Avenue, S.E.
  Washington, D.C. 20540
  (202) 707-5000
  A collection of papers, photographs, films, music, unbound serials, and sound recordings related to African Americans. The Slave Narrative Collection of the Federal Writer's Project, and collections such as the Harmon Foundation, National Association for the Advancement of Colored People (NAACP), and the National Urban League, are distinctive collections. The Library of Congress publications include Negro Newspapers on Microfilm *and* The Negro in the United States.

- **United States National Archives and Records Service**
  Washington National Records Center
  Education Branch
  Washington, D.C. 20408
  (202) 724-0455

  African American history resources for educators, such as the Teaching With Documents program, documentary teaching units on particular topics, and summer workshops for teachers are available.

3. MARYLAND

- **Enoch Pratt Free Library**
  Maryland Room
  400 Cathedral Street
  Baltimore, MD 21201
  (410) 396-5395
  This library contains over 6,000 volumes on Black history and Black culture.
- **Montgomery County Government Department of Public Libraries**
  Children's Services
  99 Maryland Avenue
  Rockville, MD 20850
  (301) 217-3837
  "Dreamkeepers," a children's booklist by Black artists and authors, is available.
- **Prince George's County Library System**
  Hyattsville Branch Library
  6530 Adelphi Road
  Hyattsville, MD 20782
  (301) 699-3500
  Booklists on Black culture and history, as well as puzzles for children are available.
- **The Sojourner Truth Room**
  Oxon Hill Branch Library
  6200 Oxon Hill Road
  Oxon Hill, MD 20745
  (301) 839-2400
  This library contains a special collection of Black history materials.

4. PENNSYLVANIA

- **Martin Luther King, Jr. Reading Center**
  Herron Avenue and Milwaukee Street
  Pittsburgh, PA 15219
  (412) 622-6270
  A collection featuring books by and about Martin Luther King, Jr. and Black history reference materials.
- **Homewood Branch Library**
  7101 Hamilton Avenue
  Pittsburgh, PA 15208
  (412) 731-3080
  This main center of the local library system houses a Black history collection for children and adults.
- **Cobbs Creek Branch Library**
  5900 Cobbs Creek Parkway
  Philadelphia, PA 19143
  (215) 476-0760
  Black studies section of library emphasizing areas such as Black history, art, music, the Civil Rights Movement, and race relations.

5. VIRGINIA

- **Portsmouth Public Library**
  601 Court Street
  Portsmouth, VA 23704
  (804) 393-8501
  Reference materials such as African American encyclopedias, biographies, and a limited videotape collection.
- **Blyden Branch Library**
  879 E. Princess Anne Road
  Norfolk, VA 23504
  (804) 441-2852
  Extensive collection of Black Studies resources including biographies, encyclopedias, and dictionaries, and works by Coretta Scott King.

I. MAGAZINES

- ***American Visions***
  National Museum of American History
  Smithsonian Institution
  1538 9th Street, N.W.
  Washington, D.C. 20001
  (202) 462-1779
  Contains articles on African American culture.
- ***Black Enterprise***
  130 Fifth Avenue
  New York, N.Y. 10011
  (212) 242-8000
  A business-oriented magazine for Black entrepreneurs.
- ***Ebony***
  Johnson Publishing Company
  820 South Michigan Avenue
  Chicago, IL 60605
  (312) 322-9200
  A general interest picture magazine for Black readers.
- ***Essence***
  1500 Broadway
  New York, NY 10036
  (212) 642-0600
  Contains articles on issues of Black women, such as careers, education, finances, and parenting.
- ***The Griot***
  Anansi Publications
  P.O. Box 313, Hillsborough Street
  St. Georges, Grenada
  (809) 440-3713
- ***Jet***
  Johnson Publishing Company
  820 South Michigan Avenue
  Chicago, IL 60605
  (312) 322-9200
  A weekly national news magazine.
- ***Sage: A Scholarly Journal on Black Women***
  P.O. Box 42741
  Atlanta, GA 30311
  Bibliographies and book reviews highlighting the scholastic contributions of Black women.
- ***Sepia***
  Sepia Publishing Corporation
  1220 Harding Street
  Fort Worth, TX 76102
  Contains articles oriented to young Black families featuring topical and contemporary articles.

Sources for a complete listing of publications are:

The Black Books Bulletin. Compiled by the African American Book Center, Chicago: 3rd World Press, 1991.

The Black Resource Guide. R. Benjamin and Jacqueline Johnson Publishers, 1990-1991.

Check the Subject Guide or Index of these directories for listing of those periodicals and publications that address Black studies. These directories are published annually and are found in many library reference departments.

Books In Print

Gale Directory of Publications

Standard Periodical Directory

Ulrich's International Periodical Directory

J. NEWSPAPERS

1. DELAWARE

- ***Delaware Valley Star***
  1050 A.S. Market Street
  Wilmington, DE 19801

2. DISTRICT OF COLUMBIA

- ***Africa and the World***
  Institute for Independent Education
  1313 North Capitol St., N.E.
  Washington, D.C. 20002
  (202) 745-0500
- ***Afro-American Newspapers***
  2002 11th Street, N.W.
  Washington, D.C. 20001
  (202) 332-0080
- ***The Washington Informer***
  3117 Martin Luther King Jr. Avenue, S.E.
  Washington, D.C. 20032
  (202) 561-4100

3. MARYLAND

- ***African-American News & World Report***
  325 East 2nd Street
  Baltimore, MD 21218
- ***Afro-American Newspapers***
  628 North Eutaw Street
  Baltimore, MD 21201
  (410) 728-8200

4. PENNSYLVANIA

- ***New Pittsburgh Courier***
  315 East Carson Street
  Pittsburgh, PA 15219
  (412) 481-8302
- ***Philadelphia New Observer***
  1930 Chestnut Street, Suite 900
  Philadelphia, PA 19103
  (215) 665-8400
- ***Philadelphia Tribune***
  520 South 16th Street
  Philadelphia, PA 19146
  (215) 893-4050

5. VIRGINIA

- ***Afro-American Newspapers***
  214 East Clay Street, Suite 409
  Richmond,VA 23219
  (804) 649-8478
- ***New Journal and Guide***
  353 F Tide Water Drive
  Norfolk, VA 23509
  (804) 625-3686
- ***Roanoke Tribune***
  P.O. Box 6021
  Roanoke, VA 24017
  (703) 343-0326